DOCUMENT RESUME

ED 185 310 CE 024 673

TITLE	Initiation of Student-Paced Learning Modules in Graduate Training Programs in Health Administration/Planning. The Comprehensive Final Report, October 1, 1978 through December 31, 1979.
INSTITUTION	Alabama Univ., Birmingham. School of Community and Allied Health.
SPONS AGENCY	Health Resources Administration (DHEW/PHS), Bethesda, Md.
PUB DATE	80
CONTRACT	232-78-0182
NOTE	155p.; Small type in the appendixes will not reproduce well.
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	*Administrators; Economics; Educational Cooperation; *Graduate Study; *Health Education; *Health Personnel; Higher Education; Information Dissemination; *Learning Modules; Material Development; Money Management; *Pacing; Programed Instructional Materials
IDENTIFIERS	Word Processing

ABSTRACT

A project investigated the use of self-paced modules to increase the sophistication of financial management, health economics, and quantitative methods as taught in graduate programs in health services administration. The first major activity of the project was a national workshop devoted to (1) developing and sharing modules; (2) using modern word processing technology to develop, maintain, and share modules; and (3) using the modules in the self-paced mode of instruction. Additional activities of the project included counseling sessions at some of the participating universities and working with modern word processing equipment. The major conclusions drawn in the project were that these teachers agreed with the potential usefulness of a large number of such modules and agreed that through collaboration they could develop, exchange, and produce the modules, but that there was not an existing, natural mechanism to cause them to collaborate. A major recommendation of the project was that a national center be established to stimulate and coordinate the development, maintenance, distribution, and use of the modules. (Author/LRA)

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ED185310

INITIATION OF STUDENT-PACED LEARNING MODULES IN GRADUATE TRAINING PROGRAMS IN HEALTH ADMINISTRATION/PLANNING

The Comprehensive Final Report

Covers Period of Performance
During
October 1, 1978 - December 31, 1979

Contract No. HRA 232-78-0182

Contractor

Graduate Program in Hospital and Health Administration
School of Community and Allied Health
The University of Alabama in Birmingham
Birmingham, AL 35294

Contractor's Project Director: Tee H. Hiett, Ph.D.

Sponsor

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Estimated Cost of Contract: $125,000

U S DEPARTMENT OF HEALTH
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ABSTRACT

In the fall of 1978, The University of Alabama in Birmingham was awarded a fifteen-month contract to extend its investigation of the use of self-paced modules to increase the sophistication of financial management, health economics, and quantitative methods as taught in graduate programs in health services administration.

The first major activity of the project was a national workshop devoted to developing and sharing modules; using modern word-processing technology to develop, maintain, and share modules; and using the modules in the self-paced mode of instruction. Additional activities of the project included counseling sessions at some of the participating universities and working with modern word-processing equipment.

The major conclusions drawn in the project were that these teachers agreed with the potential usefulness of a large number of such modules and agreed that through collaboration they could develop, exchange, and produce the modules, but that there was not an existing, natural mechanism to cause them to collaborate. A major recommendation of the project was that a national center be establish to stimulate and coordinate the development, maintenance, distribution, and use of modules.

CHAPTER I

RATIONALE FOR THE PROJECT

In the fall of 1978, the Department of Health, Education, and Welfare (DHEW) awarded The University of Alabama in Birmingham (UAB) a fifteen-month contract to:

1. Conduct a workshop for interested teachers of financial management, health economics, and quantitative methods in health services administration to acquaint them with the development and use of self-paced modules

2. Provide some counseling to university programs with faculty interested in using modules

3. Experiment with word-processing technology in the development and maintenance of learning modules

4. Report on the project

The dominant thesis or theme of this project was that education in many subjects in quantitative methods, financial management, and health economics in health services administration could be more efficient if the teacher had access to a large number of modules from which to select specific modules for each student who would study them at his own pace, requesting help from the teacher as needed.

A secondary theme of the project was that the development of this large set of modules requires such effort that teachers of financial management, health economics, and quantitative methods should collaborate in the development and exchange of the modules and share the effort.

A third theme of the project was that evolving word-processing technology provides an efficient means for developing and exchanging modules.

The activities and findings of the project are presented in this report. This first chapter includes the background for the project and a description of this final report.

Background

As the roles of health service administrators changed in the 1970's in response to such stimuli as rapidly rising cost and increasingly complex organizations, directors of graduate programs in health administration searched for ways to modify their programs in order to better prepare their students. The directors especially searched for ways to include a greater degree of sophistication in financial management, health ecomomics, and quantitative methods.

However, most of these graduate programs had several common characteristics which made it exceedingly difficult for these directors to make the desired changes. Compared to some graduate programs, for example business administration, most graduate programs in health services administration had relatively few students. A further complication was that these few students had extreme differences in mathematical and verbal skills. Added to this complexity was the fact that these programs also had only a few teachers and these teachers had to teach an increasing number of courses. A further complication was that the content in many of these courses was changing rapidly, especially in those courses in financial management, health economics, and quantitative methods which the directors were trying to improve. One additional complication was that these directors were also under pressure to make these same courses available in continuing education programs.

Officials in the Bureau of Health Manpower of the Department of Health, Education, and Welfare (DHEW) responded to the need of the directors of graduate programs with several grants and contracts to investigate the educational needs of health administrators and to explore innovations in methods of teaching future administrators. Among the universities participating in these research efforts was The University of Alabama in Birmingham (UAB).

In 1973, when Charles L. Joiner, Ph.D. and Tee H. Hiett, Ph.D. realized the potential for self-paced learning modules in their courses in quantitative methods and health economics for graduate students in hospital and health administration at UAB, the idea seemed wonderfully simple. Identify each topic to be learned. Specify learning objectives for each topic. Identify learning resources and activities for each topic. Put the objectives and instructions into a handout for each topic and make the handouts available to each student. Require students to study each handout and to demonstrate proficiency as specified in the objectives. As Drs. Joiner and Hiett began developing modules, they found that even though the concept was simple, the activities were overwhelming; so they sought assistance.

In 1974, a cost-sharing contract was awarded UAB by DHEW to explore the development and use of modules to teach topics in quantitative methods (QM), financial management (FM), and health economics (HE) to students in the Graduate Program in Hospital and Health Administration (GPHHA) at UAB and to report on the process. Among the conclusions presented in the final project report were:

1. Student-paced learning modules are both efficient and effective for teaching many topics in financial management, health economics, and quantitative methods

2. There is a potential need for several hundreds of modules

3. Developing a set of modules requires so much time and effort that development would be almost impossible without the use of the rapidly evolving technology of word processing

4. There are some teachers interested in cooperating in the development and sharing of modules.

These findings indicated that self-paced modules could help directors of graduate programs in health services administration achieve a greater degree of sophistication in financial management, health economics, and quatitative methods, but they also indicated that a much larger number of modules should be developed.

Alsc during the project, a number of teachers in other graduate programs in health services administration indicated interest in learning about the development and use of modules in courses in financial management, health economics, and quantitative methods. At a workshop at the University of North Carolina in 1976, a description of the project was presented to educators from 25 universities from across the nation and from Canada and Mexico. Not only were these educators interested in the project and in receiving copies of the modules, they also expresssed an interest in participating in a workshop on developing modules. At the completion of the project in 1977, educators from 13 universities had expressed interest in sending personnel to UAB to learn about developing and using self-paced modules in health services administration.

Thus, the findings of the project pointed to a second research phase: an examination of the prospects for and the benefits of involving teachers of financial management, health economics, and quantitative methods in health services administration from different universities in

the coordinated development, exchange, and use of student-paced learning modules.

Organization of Report

The first major activity of the project was the workshop. The Proceedings of the Workshop in Chapter II include a review of some of the planning for the workshop, including the identification of the six major topics of the workshop: definition and format of a module, use of modules, number of modules, effort to develop modules, modules and word processing, and a national center. Chapter II contains a section for each of the six major topics and two additional sections devoted to the group sessions and to other sessions. Each of these sections includes a review of the materials presented at a session or a discussion of the activities of a session. The final section in Chapter II presents some of the reactions of the participants as indicated by the group presentations at the workshop.

Additional information related to the workshop materials in Chapter II is included in the Appendix. The names of universities invited to and the universities participating in the workshop are in Appendix B-1. The names of workshop participants, visitors, and consultants are in Appendix B-2. A map displaying the geographical dispersion of the workshop participants is in Appendix B-3. The formal program for the workshop is presented in the agenda in Appendix C-1. Appendix C-2 contains the names of each workshop group, and Appendix C-3 contains the list of topics for modules generated by these groups. Sample handouts of modules and other materials related to the use of modules are included in Appendix G.

The second major project activity specified in the Contract was counseling and instructions regarding use of self-paced modules. This activity and the associated findings and experiences are described in Chapter III.

Several additional project activities are also described in Chapter III. Although not explicitly identified as an activity in the Contract, a secondary project activity implied by the support for the equipment and described in Chapter III was to experiment with a modern word-processing system, especially as such a system is used in the development, maintenance, and exchange of learning modules. Since word processing is a rapidly evolving technology and since this technology makes feasible the development, maintenance, and exchange of modules, and since the exchange of the self-paced modules are at the focus of the project, one of the imputed activites of the project was to identify other organizations making similar use of word processing. And finally, since the development and use of self-paced modules are the heart of this project, their use and development was continued in the Graduate Program in Hospital and Health Administration at UAB during the project. All of these activities, including some of the experiences and findings, are described in Chapter III.

Additional material related to the activities described in Chapter III are presented in the Appendix. A description of four organizations which make similar use of word processing is presented in Appendix D. Appendix E contains a paper which is distributed to entering students in the Graduate Program in Hospital and Health Administration at UAB. This paper, which presents a challenge to the students, includes a description of the use of the self-paced modules.

The paper on the use of word processing in the development of materials for Personalized Systems of Instruction (PSI) in Appendix F includes a description of word-processing systems and of PSI. This paper also includes an argument for a large number of modules in order to extend self-paced programs to truly personalized systems of instruction.

The conclusions in Chapter IV, which are drawn from the findings and experiences reported in Chapter III, include a discussion of the continuing potential for the development, maintenance, and exchange of modules and the identification and examination of some of the problems of getting teachers involved in this process. Also included in the recommendations section of this chapter is a description of an organization with possible policies and operating procedures designed to obtain the cooperation of teachers in the development, maintenance, and exchange of modules. A review of these recommendations by Mr. James W. Johnson, Director of CONDUIT which is one of the model organizations identified in Chapter III and described in Appendix D-1, concludes Chapter IV and the report.

CHAPTER II

WORKSHOP PROCEEDINGS

The initial activity of the project was to develop the program for a workshop for teachers of quantitative methods, financial management, and health economics in health services administration. The Contract for this project specified a workshop to address the use of student-paced learning modules as an efficient and effective means of teaching sophisticated financial management, health economics, and quantitative methods in graduate programs in health services administration and planning. It became evident during planning for the workshop that the change to a teaching method involving students setting their own learning pace without necessarily hearing even one lecture by the teacher was so extreme as to inhibit acceptance by teachers who were comfortable with the traditional teaching method with its textbooks and regular, routinely scheduled lectures and examinations. It also became evident that this change could be made less extreme by divided it into two stages with the first being the development, maintenance, and exchange of modules among teachers and the second being the use of the modules in the self-paced mode.

The initial emphasis on module development would not necessarily represent an extreme change since the modules could be used even with traditional methods of teaching; for example, modules could be used for reference somewhat as chapters in a textbook or lesson plans. Also, since almost all educational materials, especially in health services

administration, undergo continuous change, the concept of routine and regular editing and updating of modules should be accepted as reasonable. The exchange of modules would emphasis a sharing among the teachers. Such a division of labor would also be an economical means of producing the large number of modules which could be used in financial management, health economics, and quantitative methods in health services administration.

However, the development and maintenance of even a few modules require such effort that it is almost impossible without the rapidly evolving technology of word processing. Such technology may also provide a convenient and efficient means of sharing modules. Therefore, including the latest capability of this technology in the workshop should reduce the resistance to change generated by realization of the amount of time and effort to produce and maintain modules.

The final emphasis should be on the use of modules in the self-paced or personalized method of instruction. Most graduate programs in health services administration have relatively few students with wide differences in mathematical and verbal skills and a few teachers to teach an increasing number of courses in which the content is rapidly changing. If a large number of well-maintained and practical modules were available to these teachers and they had the facility with which to edit them, it seems only reasonable that these teachers would begin to use the modules to develop personalized courses of instruction for their students.

Such workshop planning produced the six major topics of the workshop: definition and format of a module, use of modules, number of modules, effort to develop modules, modules and word processing, and a

national center. The formal program for the workshop is presented in the agenda in Appendix C-1.

Also during the workshop planning, participants for the workshop were identified. Graduate programs of health services administration in 23 universities from across the nation were identified on the basis of known interest in developing and using modules, of geographical dispersion, of enrolling minority and women students, and of diverse program settings. Directors of these programs were contacted by telephone, the nature of the workshop was explained to them, and they were given the opportunity to send two participants to the workshop. The names of universities invited are in Appendix B-1.

On March 20, 1979, 35 participants from 20 universities, along with seven visitors and consultants, met at UAB for the three-day workshop. The names of participating universities are in Appendix B-1, and the names of participants, visitors, and consultants are in Appendix B-2.

The proceedings in this chapter contain a section for each of the six major topics of the workshop and two additional sections devoted to the group sessions and to other sessions. Each of these sections includes a review of the materials presented at a session or a discussion of the activities of a session. The final section in this chapter presents some of the reactions of the participants as indicated by the group presentations.

Definition and Format of a Module

The first formal session was devoted to an examination of the instructional module as developed at UAB. This session was organized around an examination of modules which were included in the handouts

given to participants upon registration. Included were modules for accessing the central computer through a remote terminal and entering, editing, and manipulating data in the computer and modules for entering, editing, and manipulating text in a word-processing system. These modules were also used by participants in the group sessions during the late afternoons and evening to provide "hands-on" experience with computer terminals, with word-processing systems, and with the modules.

Definition

As the term is used in this project, module refers to a teaching/learning strategy organized around an idea, a logical group of selected ideas, a topic, or a discrete segment of a course. In terms of the amount of material presented to the student, a module is approximately equivalent to a one-hour lecture, an article in a journal, or one-fourth/one-third of a chapter in a textbook. A module is organized into a printed handout which focuses attention on the learning to be attained by each student and the media resources and experiences to assist this learning. With the handout for a module, a student should know precisely what performance is expected and what activities can be engaged in to achieve the required competence.

Format of a Handout for a Module

The sections of the handout of a module are (1) number and name, (2) prerequisites, (3) references, (4) rationale, (5) objectives, and (6) suggested study guide. Sample module handouts are in Appendices G-4 and G-5.

Number and Name. A reference number provides a means of identifying and sequencing modules within, across, or between courses whereas the title identifies the topics covered in the module.

Prerequisites. In this section are identified the modules and other educational experiences required for this module.

References. The reference section identifies learning resources (1) which the students are to purchase, (2) which are attached to the instructional study units, or (3) which are available in the library or in the learning center. Non-printed media such as film, slides, and tapes as well as printed media such as books, journals, and manuals are listed in this section.

Rationale. The rationale relates learning exeriences and requirements to professional practice. It explains why the material is important to the student professionally, how competencies attained could or would be useful in the future, or upon what assumptions the material is based. Although the many and varied applications of the subject matter might be obvious to the instructor, they might not be obvious, or for that matter discernable at all, to the student. Consequently, the rationale typically includes examples depicting hospital or health services management applications. The student is told in empirical, theoretical, or practical terms how the content of the module applies to health services management.

Objectives. An objective is one or more explicit statements describing the competency a student is expected to demonstrate upon completion of the module. An objective identifies the behavior a student is expected to display as evidence of learning; thus, it functions both as a learning facilitator and as a means of evaluation.

Suggested Study Guide. The suggested study guide documents specific learning activities and materials designed to aid the student in

acquiring the proficiency identified in the objectives. The activities could include:

1. Lectures
   a. Straight lecture
   b. Lecture with visual aids
      (1) Blackboard
      (2) Overhead transparencies
      (3) 35 mm slides
      (4) Flip charts
      (5) Handouts
      (6) Movie films
      (7) Television films
      (8) Combination of above
2. Individual consultation
3. Individual or small group audio-visual presentation
   a. Television tapes
   b. Movie films
   c. Synchronized 35 mm slides and audio tapes
   d. Audio tapes with booklet or handout
4. Study assignments
   a. Handouts
   b. Manuals
   c. Articles
   d. Books
   e. Programmed instruction
5. Practice assignments
   a. Case studies
   b. Problems
   c. Projects
   d. Reports
   e. Exercises
6. Seminars
7. Combinations of above

Pages in a Handout

The number of pages in the handout for a module varies from 4 to 50, depending upon the amount of original material in the Suggested Study Guide. Only four or five pages may be required for a module referencing adequate, existing documentation, such as a standard textbook in statistics. Other modules having extensive original material in the Suggested Study Guide, such as the UAB modules on cost finding and reversed cost finding, require 30-50 pages.

Use of Modules

From the definition and the format of a module, it should be obvious that modules can be used with many different methods of instruction. Modules can be put together and used much as a textbook in conjunction with lectures. Modules can be used as laboratory exercises for a part of a course in association with lectures. Modules can be used as supplemental reading much as journal articles are used. Modules can also be used as self-paced instructional materials in which students work through the modules at their own pace.

Experience at UAB indicates that learning with the modules as self-paced instructional materials can be more efficient and more effective than learning through the conventional lecture in those subjects which are adaptable to this approach. In order to achieve the most efficiency and effectiveness possible, however, the traditional organization and management of a course must be changed from that used with the traditional lecture method. For most efficiency, modules should not merely be substituted for the classroom lectures.

Each year modules have been used at UAB, the organization and management of the courses have been modified, and changes are still being made. At the end of each year, the students who studied with the modules are interviewed. Their comments, suggestions, and experiences are used to modify the modules and the management of the modules. The following is a brief, general description of an educational process using modules as self-paced instructional materials. (For more information about the self-paced use of modules, see the challenge to GPHHA students in Appendix E.)

In courses in statistics, computers, and quantitative methods, there are only a few lectures with most of the learning being directed through self-paced modules. At the beginning of these courses, the students are given a list of the modules required for the courses and copies of handouts for all required modules. (For an example of the material given to the students, see Appendix G.) In lieu of lectures, the teacher is available in the classroom each Monday, Wednesday, and Friday at 1:00 p.m. to help any student or group of students who are having problems. After all problems have been resolved and all questions have been answered, the teacher is available to check-in modules.

A student who can demonstrate proficiency as specified in the objectives in a module can check-in that module. When the student demonstrates proficiency, the teacher accepts the critique sheet from the submitted module, and the student gets "credit" for the module. The student unable to demonstrate proficiency is sent back for additional study and exercises, without credit and without any penalty.

The number of modules, projects, and other exercises required for the grade of C, B, and A is identified at the beginning of a course. (For a sample schedule, see Appendix G-1.) A student reaching an acceptable grade in the course notifies the teacher and a grade is sent to the registrar's office. A student not completing the requirements for the desired grade by the end of the quarter will receive the grade of I, with no penalty. Whenever the student with the grade of I does complete the requirements for the desired grade, the registrar's office is notified.

Number of Modules

Although instruction in courses in financial management, health economics, and quantitative methods in the GPHHA at UAB has been individualized to some extent by pacing, all students are still required to work through the same sequence of modules. There is a need for access to a large number of modules especially in programs in health services administration in which students present a wide variety of backgounds, capabilities, and interests. In such programs, a teacher of quantitative method needs access to modules in mathematics ranging from such basic concepts as a system of coordinates through concepts involving integration and modules in statistics ranging from simple description through such complex procedures as factor analysis. Equally wide ranges of modules are needed in topics in financial management and health economics.

With the availability of a large number of modules, the opportunity exists to respond to more significant dimensions of individual student differences--that is, differential ability levels and interests. With the GPHHA faculty's technical understanding of and experience in module development and with a core of modules to serve as a springboard for developing branching sequences, alternative instructional materials could be implemented.

Consider the following hypothetical example. A set of 243 modules is available to GPHHA students in three courses in quantitative methods/management science. Of these modules, 60 are designated as core modules; 183, as elective. Each student is required to complete a minimum of 20 core modules in each course. Completion in this context is synonymous with demonstrated "mastery" of the stated objectives of the

module. Completion of the core modules insures the mastery of fundamental ideas, principles, concepts, or processes and consequently ensures a minimum competency level for each of the GPHHA graduates and thus maintains the integrity of the program. The number of modules mastered above the core requirements (which equate to a grade level of C) determines the extent to which a student is willing to make an investment in a course and consequently determines variations in grades. By completing 10 additional modules in each course, a student could earn B's in these courses. By completing still another 10 modules in each course, the students could earn A's. So, depending upon the time and responsibilities of each student and depending upon the needs, interests, and desire for in-depth knowledge of particular topics, a student could opt for an A or a B or a C in any of the courses. With these options, a student could complete as few as or as many as 120 modules, and satisfy the requirements of this course sequence. Ambiguity about competencies and grades would be alleviated since the student selects his own level of performance and commitment and determines his own pace according to his capabilities and ambitions.

The total number of modules cited in the example is purely hypothetical. The total number of core and elective modules to be made available might be 500, 600, or even 2,000. In any event, each student would have exposure to fundamental concepts through the core modules and would be given the option to select additional modules to meet specific needs and interests. The core modules can be viewed as a funnel through which all students must pass and demonstrate proficiency. The elective

modules would then allow each student to pursue a unique set of educational and professional goals—likely to overlap those of some other students but not replicate them exactly.

As students experience their freedom and its possibilities with these elective modules, they may be motivated to learn, not because of requirements but because of interest. This change might even motivate students to work on modules regardless of the grade requirement. For example, a student who becomes engrossed in computer programming may study all of the modules on the subject even though the requirements for A's in the coursework have already been met.

A large number of modules and a wide range of topics covered by the modules would permit every GPHHA student to study in depth the topics of most interest and to achieve full potential. It also would leave an option open for the student who is not academically, psychologically, or professionally prepared to cope with a specific elective sequence of modules. Each student can build on existing skills and develop lagging ones. Supplementary (non-credit bearing) modules on requisite concepts and principles for the core modules would also be available for those students needing to overcome deficiencies in their pre-graduate education.

With a large number of these modules stored in a computer, it would be possible to give entering students a battery of diagnostic tests, enter the test results into the computer, and have the computer print specific core modules (including supplemental or remedial modules as needed) for each student based upon the achievements on the tests. Such a use of the computer, diagnostic testing, and lesson plans is being implemented in some educational programs by Mr. Robert M. Smith, a

consultant to the workshop. Mr. Smith described this program and related its use to modules as defined in this workshop.

Effort Required to Develop Modules

> "To Marilyn and Frances, our wives, for their patience and understanding about the demands of time the manuscript has taken."

With this dedication of their book The Financial Management of Hospitals, Berman and Weeks join other authors in lamenting the amount of time and effort required to write a textbook. The topics to be included have to be identified and organized into chapters and sections of chapters. In terms of time and effort, writing a scholarly article for a reputable journal is comparable to writing a chapter in a textbook. Sources of material for each topic have to be identified. The material, the examples, and the exercises for each topic have to be developed. The charts and the drawings for the figures have to be prepared. The data for the tables have to be organized and edited. The first draft of each section must be written. Each section must be edited and rewritten several times. Then all of the sections must be edited together to assure consistent terminology, uniform development, and smooth transitions among sections and chapters. In academic circles, writing a textbook and writing journal articles are considered serious undertakings, requiring considerable time and effort.

The development of an initial set of modules also requires considerable effort and time. Time is required to identify the topics, to organize the topics into modules, to identify sources of material, to organize the modules into a sequence, to identify the learning activities for each module, to identify the objectives for each module, and to

draft the initial handouts. Each of the handouts goes through the same basic editing process as is required in the sections of textbooks and articles. Authors of textbooks and journal articles can recognize that the initial development of modules can be as time consuming as the initial development of any major written work.

Modules and Word Processing

The amount of time and effort to develop even one module and the potential need for such a large number of modules presents a workload to cause even the most dedicated teacher to ignore the potential for modules. But part of the effort can be eased by the application of computer technology to the processing of words. It is a well accepted fact that computers can process data faster and more accurately than humans can. What is not well known is that the same computer technology used to process data (data processing) can also be used to process words (word processing). What is most important here is the application of word processing to the development of learning modules. (For a more extensive discussion of the use of word processing in developing modules, see the article in Appendix F.)

Although different word-processing systems have different capabilities, all have basic and common functions. The first draft of the written material is recorded in machine-readable form on some magnetic medium as it is typed. Using the word-processing technology in the editing process, the author/operator quickly searches through the material to make only those changes desired without retyping any of the unchanged material. Typically, the author/operator can have the revised version typed while another document is being edited or drafted. In any

event, the current version of the document is maintained in machine-readable form on magnetic medium. The capability of word processing is useful in developing modules and in maintaining modules.

As with any scholarly writing, extensive editing is essential to the development of a module. The technology of word processing permits efficient editing to assure that the material is correct and precise and that the terminology and the formats among the modules are consistent. With modern word processing, an author can efficiently "polish a paragraph" until it says exactly what he wants it to say.

Word processing also facilitates the maintenance of modules. As students get credit for each module, they identify difficulties and errors. Each year, after a class has completed the modules, they can be edited. Sections can be added, sections can be deleted, sections can be revised, and the material can be reorganized to improve the efficiency and effectiveness of the learning process for the next class.

Word processing can also aid in keeping material current. As new technologies are developed, as new references become available, and as teachers modify objectives, such changes can be made in the handouts very easily with word processing.

A National Center

Even though modern word processing provides considerable efficiency in developing and maintaining modules, a major impact of word processing may be in the sharing and exchange of modules. Even with the assistance of word-processing technology, the most dedicated teacher can develop and maintain only a few hundred modules over a few years. Although this number of modules may be adequate for a self-paced program

of instructions, a teacher may need access to a few thousand modules to develop truly personalized courses of instruction.

If many teachers within a discipline could have access to modern word-processing systems, if these teacher would collaborate in identifying the topics for which modules could be developed, and if they would divide the topics among themselves with each teacher developing, testing, maintaining, and sharing his modules, each teacher would have access to the large number of modules with which to personalize the courses.

Consider a specific example. Suppose several teachers of financial management, health economics, and quantitative methods in graduate programs in health services administration would collaborate in the development, maintenance, and exchange of modules. These modules could be stored in both machine readable form and typed form in some national center for distribution. Each of these modules would be edited and updated annually by the author. All of the modules would be available for distribution to teachers in graduate programs in hospital and health administration in either typed copy or machine-readable copy. A teacher using any of the modules could be given considerable editorial latitude in modifying the modules so they reflect the objectives of that teacher (still giving recognition to the author of the modules). Such modifications could be made by the teacher through word processing at his university or for the teacher at the national center.

A national center may be required to stimulate and to coordinate the development, maintenance, and exchange of modules. Coordination, as the term is used here, means the identification of the topics susceptible to this methodology and the identification of a teacher or teachers

with the expertise and interest in developing a set of modules for these topics. Stimulation, as the term is used here, means causing teachers with specific capabilities to develop an initial set of modules, to introduce the modules into the system, to revise and up-date these modules annually, and to participate in the use of these and other modules.

Group Sessions

Four group sessions were held in the late afternoons and the evenings in which the participants worked in small groups of five members each. Each group was scheduled for four different sessions. Two of the sessions were devoted to word processing, in which the participants used self-paced modules and practiced at workstations on a word-processing system. During these sessions, the participants entered, edited, and moved text around on the system. A third session was devoted to the use of modules on a data-processing system (the traditional use of computers). The participants, using the modules, accessed the central computer at UAB, entered data into the computer, edited the data, and used the Statistical Analysis System (SAS) to perform analysis on data stored in the computer. A fourth group session was devoted to expanding the list of topics for which modules could (and should) be developed and developing a group report to be given orally on the final day.

Other Sessions

In one session, Mr. James Johnson discussed the similarities between this project and CONDUIT, the organization he directs. In 1971, the directors of five university computer centers organized CONDUIT with the objective to stimulate the development of and to collect, edit, and

disseminate materials to increase the efficient use of computers in university education. One of the initial research points of CONDUIT was to determine if teachers could be induced to develop educational materials for dissemination through CONDUIT. The successes of CONDUIT indicate that teachers will develop and submit materials to be shared. A second major finding of CONDUIT was that considerable editing and testing effort is required on materials obtained from teachers. Mr. Johnson also described how he personally uses word processing for his own work and how word processing was used to edit the documentation for the computer programs and other materials distributed by CONDUIT. For additional information about CONDUIT, see appendix D-1.

The first session on the last day, Friday, was devoted to a presentation by each of the small groups of participants. Each group was given the opportunity to share their views, thoughts, and recommendations. Also during this session, each individual at the workshop was given the opportunity to share his experiences, views, and recommendations with all participants. During this session, the groups identified the 47 topics for which they would like to have modules developed. (See Appendix C-3 for the list of topics.)

In one session on Friday, Dr. Stephen [illegible]. Bono, of the Department of Family Practice at the Medical College of Georgia and a consultant to the workshop, summarized what he had heard at the workshop and made recommendations for future actions. Dr. Bono, who has had considerable experience with curriculum development, especially with Personalized Systems of Instruction (PSI), developed a consultant's report of the workshop which is attached as Appendix A.

Reactions of Participants

Each of the small groups met for lively and productive discussions and work sessions on at least four occasions. On the last day of the workshop, a spokesman from each group presented their findings.

In general, all of the groups agreed with and supported the concept of modular instruction in health services administration. In part, this support was indicated by the fact that a point included in most group reports was an expressed interest in receiving further training (in the form of workshops and/or summer internships) in the development of effective modular instructional material. All of the groups also expressed a willingness to accept technical assistance in the development, maintenance, and sharing of instructional modules.

The groups also supported the concept of a national center to coordinate this effort. One group noted that, in addition to serving a necessary coordination function, a national center would serve to sanction and legitimize faculty efforts in developing and maintaining modules. It was also noted that a national center would be able, both in terms of skilled personnel and financial resources, to make optimum use of the power of word-processing technology.

The groups also generated specific questions and concerns about developing and using modules, questions which could be addressed by a national center. Some of these questions were:

1. What makes a topic suitable for a module?
2. What should be the scope and the "depth" of a module?
3. What are the characteristics of successful modules?
4. How can modules be best used in continuing education?

5. How can modules best be integrated into the educational process?

6. What types of learners should use the modules?

7. How can student assessment be improved through the use of modular instruction?

8. Can modular instruction be used to distinguish between undergraduate and graduate requirements in health services administration?

9. What type of resources could be made available to assist teachers to develop modules?

10. Who would have access to the modules developed?

11. How can word processing be made available to more universities?

Answers to such questions, made possible through the resources of a national center, would have educational implications that range far beyond the field of health services administration.

In addition, the groups also implied support by generating a list of over 45 topics for which they would like to have modules (see appendix C-3).

It is important to note that, although there was a healthy amount of skepticism as indicated by the questions posed, there were no major negative criticisms regarding either the concepts of developing and sharing modules or the development of a national center expressed during the discussions.

CHAPTER III

ADDITIONAL ACTIVITIES

The second major activity specified in the Contract was counseling and instructions regarding use of self-paced modules. Such counseling could be provided to the faculty of graduate programs in health services administration with participants at the workshop if the participants requested it. The counseling sessions are described in this chapter.

Although not explicitly identified as an activity in the Contract, a secondary project activity implied by the support for the equipment was to experiment with a modern word-processing system, especially such a system as used in the development, maintenance, and exchange of learning modules. The activities and findings of using such a center are also reported in this chapter.

Since word processing is a rapidly evolving technology and since this technology makes feasible the development, maintenance, and exchange of the self-paced modules which are at the heart of the project, one of the imputed activities of the project was to identify other organizations making similar use of word processing. Brief descriptions of these organizations are presented in this chapter.

And finally, since the development and use of self-paced modules are the focus of this project, their use and development was continued in the Graduate Program in Hospital and Health Administration (GPHHA) at The University of Alabama in Birmingham (UAB) during the project. Some

of the experiences with the modules during this period are also reported in this chapter.

Counseling

During the workshop, a few participants expressed interest in having a counseling session at their campuses. Additional requests were received after the participants had returned to their campuses, and visits were made to the nine universities identified in Appendix B-1. These locations were selected on the basis of limited previous exposure to the modular concept, of geographical dispersion, and of time available for counseling sessions.

As there was no standard format for a counseling session, each was somewhat different. Typically, a session would begin with a meeting with the participants followed by a meeting with the program director and the dean of the school. The next meeting would be with the faculty of the graduate program in health services administration as a group, followed by meetings with individual interested faculty members. At several universities, meetings were also scheduled with graduate students. The two- to three-day visit typically included a tour of the facility including the computer center. These tours also provided the opportunity to observe the development of courses in financial management, health economics, and quantitative methods and to examine the use of word processing in these programs.

The major topics or concepts at these sessions were the same as those at the workshop: (1) the development, maintenance, and exchange of learning modules in financial management, health economics, and quantitative methods, (2) the use of word-processing as a means of developing

and exchanging modules, and (3) the effectiveness and efficiency of using such modules in a self-paced, personalized mode of instruction. The concept of a national center to stimulate the development and distribution of modules was discussed at several of the sessions. A fifth topic which was brought up frequently during these sessions was the efficiency of using word processing as production equipment for the administrative office. The project findings related to this last topic are in the next section devoted to word processing

As reported in Chapter II, almost all the participants at the workshop agreed with the logic of developing and sharing modules, since this concept seems to be a logical extension of the current practice of writing and sharing articles and textbooks. This concept was also most readily accepted during the counseling sessions. Somewhat as the workshop groups generated 47 topics for which they would like to have modules, many teachers during the individual sessions identified topics for which they would like to have modules. Also during several individual sessions, teachers displayed drafts of articles and project reports and commented that the article or report would make a good module. Of the three major concepts presented at these sessions, that of developing and sharing educational materials (though not necessarily identified as modules) received the most support.

Even with all the agreement on developing and sharing modules, only eight teachers requested copies of the modules developed and maintained at UAB, even though copies of these modules were offered both in typed copy and in machine readable form. One theme which seemed common among those teachers requesting copies of modules was immediate need. Teachers developing new courses, revising courses, and rebuilding entire

programs seemed to have considerably more interest in obtaining additional instructional materials than did teachers in well established programs with well established, traditional courses.

Although several teachers during the individual sessions expressed an interest in developing and sharing modules and the offer was made to put their modules into the project word-processing system and to assist in editing, not one teacher submitted modules to be shared through the project.

The concept of using word processing as an efficient means of developing, maintaining, and even exchanging modules seemed well received at the workshop where the participants had opportunity to work with one of the latest, most modern systems. In the reality of their campus settings, especially the constraints of the budget, both teachers and program directors had difficulty with the concepts of modern word processing. They had difficulty conceiving of storing modules in and transmitting modules between word-processing systems. They had even greater difficulty thinking of a faculty member at a workstation editing a module. Their difficulty seemed to have two bases; one, a lack of knowledge about the capabilities of modern word processing, and two, the belief that such a system could not be supported within their budget.

In general, neither program directors nor teachers had difficulty with the concept of modules being developed, maintained, and distributed through a national center but missed the application of word-processing in such a center. In fact, several teachers commented on some of the similarities between that service and the services of the Intercollegiate Case Clearing House. One teacher compared the services of a national center with those of the university library. Of course both of

these viewpoints completely missed the concept of using modern word processing to update the modules at least annually and to permit the user of the modules to edit them to meet his objectives.

Additional comments and findings related to word processing are in the next section of this chapter.

During the workshop where the participants had the opportunity to use modules to learn about word processing, the concept of using modules in a self-paced method of instruction seemed fairly well received but it was the poorest received of all three major concepts. During the counseling sessions, the concept of using modules in a self-paced or personalized mode was not well received. In fact, only two teachers requested copies of modules to be used explicitly in self-paced methods of instruction, and both of these teachers were developing courses for continuing education and thought that there was some possibility of using self-paced materials in continuing education.

At some of the group sessions and even at a few individual sessions, several teachers spoke against self-paced modules using many of the standard arguments which are used against Personalized Systems of Instruction (PSI) in general. The thesis was advanced that students would not pace themselves--that they would procrastinate; just as though deadlines could not be developed for the completion of specific modules. A few teachers stated that students needed the "group" interaction of the class; just as though students do not work together on modules or that classes could not be scheduled as a part of the learning of a module. One teacher stated that students "needed" to see and hear the professor; just as though all lectures are exciting and stimulating and just as though lectures could not be a part of the learning for a

module. Another teacher argued that students needed to hear other students ask questions in class; an argument which implies that learning is a chance event depending upon whether or not a student happens to ask the right question.

At the workshop where there was considerable time in which to establish the logic of developing and sharing modules before moving to the concept of using the modules in the self-paced mode, there was little resistance to change. Such resistance at the workshop manifested itself in the form of questions to be answered by research. At the counseling session, such resistance seemed to be more antagonistic by implying that the questions had been answered and that the self-paced mode was found lacking.

During the counseling session, the major resistance to change was to the use of the modules in the self-paced mode. There was some resistance to change regarding the use of word processing, especially as to the suggestion that faculty do their own editing at a workstation. There was very little resistance to change at the suggestion that teachers develop, maintain, and share modules.

Word-Processing Center

A major focus of this project was on involving teachers in the development, maintenance, and exchange of modules. As discussed at the workshop, the effort required to develop and maintain these modules was such that their development would almost be impossible without the evolving capabilities of word processing; therefore, a major segment of this project was devoted to studying the evolution of word processing and to investigating its application in graduate programs of health

services administration. (For additional information about the use of word-processing technology in developing educational materials, see Appendix F.)

The word-processing equipment available to the project included:

1. A central processing unit (CPU) with computer technology to manipulate the text entered and stored on the system disc
2. A system disc on which 2,000 pages of documents could be stored
3. Two workstations, each with a cathode ray tube (CRT) screen for displaying words and commands and with a typewriter keyboard for entering words and commands through the screen to the system disc in the CPU
4. One high-speed (2,000 words per minute) printer for producing draft copies of documents on the system disc
5. One medium-speed (550 words per minute) printer for producing quality typed copies of documents on the system disc
6. A unit for filing copies of documents from the system disc of the CPU to a "floppy" disc
7. An optical character recognition (OCR) reader for copying directly from typewriter prepared pages into the CPU without re-keying the text
8. A device for transmitting documents through telephone lines to other word processors or to computers

Additional word-processing equipment available to the project included seven workstations, a second CPU, two additional quality printers, a signature machine, and a phototypesetter.

In addition to being used to develop, maintain, and distribute modules and other materials directly related to the project, this equipment was also used by other staff and faculty in the school. In fact, one of the aspects of the project was to investigate the ease with both staff and faculty could use a word-processing system, so anyone even

remotely associated with the Graduate Program was encouraged to use the equipment.

One point seemed clear by the end of 1979--the use of word processing systems was increasing at a rapid rate. Four identifiable trends contributed to the increased acceptance and use of word-processing technology. First, salaries of qualified secretaries were increasing rapidly, and qualified secretaries were more difficult to find. Even when qualified secretaries were available, it was not unusual for them to demand access to word processing to increase their output and quality. Secondly, the cost of word processing was decreasing. For example, the equipment rented under a contract UAB had with DHEW in 1974-1977 had a selling price of $18,000. In 1979, a far more capable system with basically the same components sold for approximately $11,000. Thirdly, the number of manufacturers offering these systems was increasing. From the magnetic tape selectric typewriter (MTST) system produced only by IBM in the late 1960's, there were at least a dozen manufacturers in 1979, and supply was creating considerable demand. And fourthly, these systems were getting easier to use. No one except project personnel took the time and effort to learn to use the word-processing equipment available in the 1974-1977 contract. Within two months after the system for this project was installed, most of the secretaries in the building had learned to use it, at least for simple recording, editing, and printing.

During 1978-1979, programs in hospital and health administration were responding to these changes by replacing secretaries' typewriters with word-processing equipment with the view that such a system was a secretary's tool. This approach to word processing was demonstrated in

a study to determine which word-processing equipment to purchase for the Health Administration and Planning Program at Washington University as reported by Woodward and Hepner in the April, 1979 issue of AUPHA Program Notes.

In a telephone survey of 27 graduate programs in health services administration in December, 1979 only ten programs had no word-processing equipment, six programs had word-processing equipment with magnetic cards, seven programs had word-processing equipment with floppy diskette storage, but only three programs had shared logic programs which would accommodate more than one workstation, two of which made use of text-editing programs on a central computer. Only two of these programs offered faculty the opportunity to edit their own materials at a workstation. Management in the other programs seemed to view word processing as merely a tool for the secretary.

Although the participants of the workshop had hands-on experience with the latest technology, based on the responses to presentations at counseling sessions and discussions with their colleagues and program directors, not many of them were successful in taking the message back to their campuses. There seemed to exist the attitude among both program directors and teachers that word processing was any piece of equipment being used instead of a typewriter by a secretary or typist. Rare indeed was the teacher or program director who could clearly differentiate between merely inputting text from a keyboard and editing text from a keyboard.

Although the approach to word processing in the School of Community and Allied Health (SCAH) at UAB had several of the characteristics of the approach of other programs, it also had several distinct

differences. The project provided the nucleus for the center. Additional support from SCAH administration provided the opportunity to expand the center in order to gain additional experience.

Both faculty and staff were encouraged to use the system. The secretaries quickly learned that the system could greatly ease their workload as they prepared lengthy papers and multiple copies of letters with each copy an original. In fact, almost all of the secretaries in the building soon became dependent upon the system for most of their typing. The results were increased productivity and higher quality. One faculty member, a young assistant professor, and three of the professional staff made use of this modern techology by entering their own materials and doing their editing and printing. Two professional staff, the finance officer and the personnel officer, were able to use the system instead of having a secretary do their typing.

The project administrative assistant and the principal investigator both used the full capabilities of the center. Originally, the principal investigator would dictate the first draft of his material, have the dictation transcribed, and then edit those materials at his workstation. With practice, he found he could efficiently create as well as edit his material at a workstation. The administrative assistant would help edit the product in the final stages to identify and correct errors. All of this final report was produced and edited on the word-processing system. This system was even used to prepare computer programs which were submitted to the central computer through a telephone line.

One of the major findings of the project related to the dependability of modern word-processing systems. Each piece of equipment

consistently did what it was supposed to do. The optical character reader scanned pages of typed text with less than one percent error, and it flagged most of the errors for easy identification and correction. The central processing units did store and manipulate text with negligible loss. The line printer produced text at 2,000 words per minute with an acceptable draft quality, and the quality printer produced excellent quality text at 500 words per minute. Even the phototypesetter produced outstanding quality directly from the system. And the procedures for all the equipment were relatively easy to learn.

Model Organizations

Even before the beginning of this project, CONDUIT was one organization known to have activities similar to those of this project. The director of CONDUIT, Mr. James Johnson, was contacted and, after the objectives and the nature of this project were described to him, agreed to meet with the participants at the workshop and describe the development and the activities of CONDUIT. Futher contact with CONDUIT was provided during the counseling session at the University of Iowa. During the visit to the campus, the principal investigator of this project had the opportunity to visit Mr. Johnson and to learn more about the activities of CONDUIT. During this visit, Mr. Johnson also learned more about the activities of this project and agreed to consult on the project report, if he could find the time. He did find the time, and his report and recommendations are included in the last chapter. A brief review of the activities of CONDUIT are presented in this section of the report and more information about COUDUIT is in Appendix D-1.

During the project, it was learned that another organization, Production Systems for Architects & Engineers (PSAE) operated as a national center for developing and disseminating written specifications for architect and engineers. Since the activities of that organization so closely parallels the activities of a national center as presented in the final chapter of this report, a brief description of that organization is presented in this section. Additional information about PSAE is included in Appendix D-2.

Three other programs which are not as well developed as CONDUIT and PSAE but which are regional in nature, which have a need for educational materials in health services administration, and which are embarked upon the use of word processing to develop such materials are the Regional Medical Educational Centers (RMEC) of the Veterans Administration and the Tribal Resources and Assistance Information System (TRAIS) and the Tribal Management Support Center (TMCS) both of the Indian Health Services. Brief descriptions of the activities of these programs are presented in this section. More information about them is in Appendices D-3 and D-4.

CONDUIT

CONDUIT was organized in 1971 to stimulate the development of and to collect, edit, and disseminate materials to increase the efficient use of computers in university education. One similarity between CONDUIT and this project is that both aim at getting teachers to develop and share educational materials. A primary difference is that CONDUIT is concerned with computer programs for all educational programs and that this project is concerned with modules for topics in financial management, health economics, and quantitative methods in health services

administration. The programs of CONDUIT could become modules for the use of the computer in quantitative methods in health services administration. It became obvious during discussions with Mr. Johnson that during its development CONDUIT underwent many of the experiences of this project. As indicated in his report, Mr. Johnson was very supportive of the efforts of this project.

PSAE

PSAE was developed by the American Institute of Architects (AIA) for the development, maintenance, and dissemination of written specifications for architects and engineers across the nation. As architect develop design concepts, they must translate them into written documents to guide construction. The AIA, recognizing that its members spent much time-consuming effort developing and editing specifications, established PSAE to provide specification services for its members. Since 1969, PSAE has been developing MASTERSPEC, a specification data bank of over 7,000 pages of specialized and technical text. Through a fee schedule, architects and engineers can acquire the master specifications in machine-readable form on cassette tapes, magnetic tapes, or diskettes and can edit those portions needed in a project and have them printed. PSAE has grown so that in the fall of 1979 over 1,350 firms subscribe to its services, with approximately 300 of these subscribers being added during 1979.

RMEC

The primary aspects of the RMEC program relevant to this project are the emphasis on educational programs in each of the regions, the emphasis on word-processing and computer systems in each center, and the emphasis on sharing information among the centers. Although the RMEC's

are initially placing emphasis on an Information Management System (IMS) to help manage the information about courses and participants, there is considerable interest in using the word-processing systems and the computer systems to development, maintain, and share educational materials. The RMEC's mission includes education related to health services administration. In fact, about ten percent of the programs of the Southeastern RMEC in 1979 were devoted to health services administration. To help meet this responsibility, officials of RMEC have an interest in developing, maintaining, and exchanging modules in health services administration and in sharing such materials with other organizations such as graduate programs in hospital and health administration.

TRAIS and TMSC

TRAIS is a network information system involving word-processing systems at each tribal center, each IHS headquarters, and IHS area office, and a large central computer. All the word-processing systems can communicate with each other and with the central computer.

A major service of the TMSC program is training for Tribal and IHS personnel in subjects in health systems management and administration. The goal of TMSC training is to further the capabilities of Tribes and Tribal organizations to administer health programs and to continually upgrade, through training, the administrative competencies of IHS personnel. To help meet their educational responsibilities, officials of TRAIS and TMSC have an interest in using their word processing capability in the development, maintenance, and exchange of self-paced learning modules in health services administration. They would also be interested in coordinating their modules and sharing them

with other organizations such as graduate programs in hospital and health administration and a national center to coordinate the development and exchange of such modules.

Continued Use of Self-paced Learning Modules

This project focuses on the development, maintenance, and exchange in both typed copy and machine readable form of self-paced learning modules. Although not one of the activities included in the Contract for this project, one major activity closely associated with this project was continued investigation of the development and use of the modules developed at UAB. This effort sustained the work initiated in the 1974-1977 contract with DHEW to develop modules.

Most of the modules devoted to quantitative methods were entered into the new word-processing system, edited to accommodate the experiences of the students during the preceding years, and distributed to students in Class 14 in 1978 and Class 15 in 1979. In addition to modifications in the modules, modifications were also made in the management of the courses. For example, a series of "mini" deadlines were established in an attempt to keep students progressing through the modules at an even pace, since experience indicated that many students tended to procrastinate. (See Appendix G-1 for the deadline schedule, and Appendices G-4 and G-5 for samples of the revised modules. See Appendix E, for the description of the management system included in the challenge to GPHHA students.) There continues to be support for the development and use of selp-paced modules in GPHHA at UAB.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

The dominant thesis or theme of this project was that education in many subjects in quantitative methods, financial management, and health economics in health services administration could be more efficient if the teachers had access to a large number of modules from which to select specific modules for their courses. A corollary to this theme was that the teachers should have access to the modules in machine-readable form and to word-processing technology to permit them to tailor or focus the modules to their specific objectives.

A second theme of the project was that the development of this large set of modules requires such effort that teachers of financial management, health economics, and quantitative methods should collaborate in the development and exchange of the modules and share the effort. One corollary to this theme was that not only must the modules be developed, but they must also be updated and revised periodically (annually). Another corollary to the second theme was that modern and evolving word processing provided an efficient and effective means for both developing and maintaining modules and even for exchanging modules.

A third theme for this project was that if a large number of well-maintained and practical modules in financial management, health economics, and quantitative methods were available to these teachers and they had the word-processing equipment with which to edit them, these

teachers would begin to use the modules to develop personalized courses of instruction for their students.

A fourth theme, developed during the project, was that modern, shared-logic word-processing systems are efficient and effective production tools, and these systems are being acquired and used by graduate programs in health services administration. A corollary to this theme was that teachers should have direct access to these systems since most teachers could edit their materials directly on the system more efficiently than they could edit by marking a copy and having a secretary make the changes.

If the success of the project is measured by how well these themes were accepted as indicated by their adoption by participating faculty in December, 1979, the project was only a limited success. If the themes were viewed as logical by most participants, if specific reasons for limited involvement were identified, and if procedures for getting teachers involved were developed, the project might be considered successful.

Conclusions about each of the themes including reasons for limited teacher involvement in the development and exchange of modules are identified in the conclusions section of this chapter. This section also includes an evaluation of the workshop as a means of extending the content and teaching method to other institutions.

Procedures for involving more teachers in the development, maintenance, and exchange of modules are presented in this chapter as recommendations.

The chapter and the report are concluded with a review of the recommendations by Mr. James W. Johnson who served as a consultant to the workshop and who reviewed this report.

Conclusions

The conclusions of this project are organized around the three principal themes: developing and sharing modules, word-processing systems, and using the modules in the self-paced method of instruction. A fourth section examines the use of the workshop as a means of extending the content and teaching method to other institutions.

Developing and Sharing Modules

The major conclusion regarding the development and sharing of modules is that the concept is generally accepted as reasonable by teachers who have carefully considered it. Acceptance is enhanced if the concept of developing and sharing modules is separated from the concept of using the modules in the self-paced or personalized mode of instruction.

Even though there was general acceptance of the concept of developing and sharing modules, none of the participants in the workshop or the counseling sessions developed and shared modules during this project. During the individual counseling sessions, several teachers expressed a seemingly genuine interest in developing modules but admitted that they would not be developing any modules. Further discussions with them led to the identification of several reasons as to why they did not develop modules.

A primary reason teachers did not develop modules during the project was that they had little incentive to develop them. As

described in Chapter II, the development of a series of modules is a major undertaking, equivalent to writing a chapter in a textbook or an article for a journal. Most teachers believed it would be to their best interest to use their limited time to develop articles for publication in journals or to write a textbook, rather than develop modules and share them with participants of this project. Writing journal articles and textbooks is generally recognized and accepted by university administration as evidence of scholarly endeavor and, as such, can be used by a teacher as justification for a salary increase, a promotion, and advancement to tenure status. Even though producing modules can be just as intellectually demanding as producing journal articles, journal articles are more readily accepted by evaluators of academic progress.

As indicated by the comments of several participants at the workshop and a few teachers during individual sessions, another reason teachers did not develop modules was that they felt a need for formal instruction in module development and a need to get away from the demands of their regular work to concentrate on developing modules. Although the workshop included a review of a format for modules, several participants indicated that one means of getting more teachers involved would be to conduct a workshop devoted solely to the development of modules.

Another reason teachers did not develop modules during this project is that there was no nationally recognized, permanent organization encouraging and stimulating the development, maintenance, and exchange of modules. Every participant knew that this project was funded only through December, 1979 and that funds to sustain this effort over several years might never be available. If they did participate in the

development of modules this year, there were no assurances that a program would be available to continue the exchange of modules in future years. The experience of CONDUIT (see Appendix D-1) indicated that even with a national, permanent organization dedicated to the development, maintenance, and exchange of modules, seven years may be required to achieve credibility and to obtain an adequate initial base of modules.

Word processing

The experience at the word-processing center of the project as reported in Chapter III, the experience of CONDUIT as reported in Appendix D-1, the experience of Production Systems for Architects and Engineers as reported in Appendix D-2, and the experience of Indian Health Services as reported in Appendix D-3 indicated that modern, shared-logic word-processing systems are efficient and effective processes.

The experience of Production Systems for Architects and Engineers as reported in Chapter III and Appendix D-2 indicated that a national center can produce, maintain, and distribute material in both printed copy and in machine-readable form and that the users of the materials can be given certain editorial latitude in editing the materials.

The experience at the word-processing center of the project as reported in Chapter III and the experience of CONDUIT as reported in Chapter III and Appendix D-1 indicated that modern, shared-logic word-processing systems can be used by professionals to edit their materials efficiently.

Experience during the counseling phase of the project and the results of a telephone survey in December, 1979 indicated that word processing are being used in programs in health services administration,

even though initially these systems are rather simple. It seems reasonable that the use of these systems will continue to expand. It also seems reasonable that as more and more programs acquire these simple word-processing systems, learn to use them, and learn what can be done with more sophisicated systems, more programs will trade their simple systems for more sophisticated systems, including systems with shared-logic. As more word-processing systems are upgraded, more teachers will begin to edit their own materials at their own workstations.

Self-Paced Modules

If the use of modules in self-paced instruction requires a large number of modules and requires that teachers have access to word-processing systems to focus the modules to their own objectives, one should not be surprised to find that if teachers are not involved in the development and sharing of modules and if teachers do not have access to these modern word-processing systems, they have difficulty even considering the concept of self-paced instruction.

Teachers demonstrated a positive attitude toward and a general acceptance of the concept of developing and sharing modules. Given access to a large number of modules in a subject, given access to word-processing systems with which to edit the modules, and given the heterogeneous group of students in most health administration programs, it seems logical that teachers will naturally turn to using the modules in the self-paced mode. At such a stage, the teachers would be developing truly personalized systems of instruction.

The Workshop

The national workshop met a specific need of this project in that it provided a means to expose 35 teachers of financial management,

health economics, and quantitative methods in health services administration to the three primary concepts of the project. At the workshop, the participants were away from the demands of their regular job. They had access to the most current version of modules. They had access to the most sophisticated version of word processing. And they had the opportunity to use self-paced modules to learn to use word processing. Also at the workshop, there was time to develop the concepts slowly and logically and in sequence. This environment created an atmosphere in which the participants responded positively to the concepts.

In contrast, during the counseling sessions, the participants were aware of the immediate pressures of their regular job and they knew that in a short while they would be back to completing the task on their desk in the next room. They had to imagine the capability of modern word-processing systems. They had to imagine the efficacy of self-paced modules. And they had to hear about developing and sharing modules, word processing, and self-paced modules all in a relatively short time period. Most of the teacher resistance to change was evidenced during the group counseling sessions.

So the workshop provided a means of more throughly testing receptivity to the major concepts of the project. However, this workshop was not successful in extending the content and teaching method to other institutions for the very reason it was successful in this project; it dealt with general concepts, not specific activities such as developing modules. Recommendations in the next section include educational and training programs devoted explicitly to the development and maintenance of modules and to the use of modules.

Recommendations

If teachers of quantitative methods, financial management, and health economics in health services administration programs are to collaborate in the development and exchange of modules, it is recommended that a national center be established to stimulate and to coordinate the development of modules and to provide for organizing, editing, and distributing modules.

Although it is not the purpose of this project to develop the specific policies and operating procedures of such a center, many of the functions of such a center could be indicated by a discussion of possible policies and procedures. Included here are a list of such policies and procedures and a discussion of each.

Some of the major policy characteristics of such a center include:

1. The initial funding period for the center should be long enough to indicate permanence.
2. A national advisory committee of recognized leaders in education in health services administration should develop the policies of the center.
3. The center should have an editorial review committee and technical reviewers for the modules.
4. Initial support for the center should provide funds with which to "pay" the producers of the initial set of modules.
5. The center should be located within a university with a graduate program in hospital and health administration.
6. The teachers using the modules of the center should be given some latitude in editing them.

As some of its operational procedures, the center should have:

1. A modern word-processing system and access to a large computer system
2. The capability to distribute modules in both typed copy and in machine-readable form

3. The capability of translating machine-readable input and output compatible with the major word-processing systems

4. Both an editor of English and an editor of educational concepts

5. A program to train teachers in the use of word-processing systems

6. A program to train teachers in the development and maintenance of modules

7. A program to train teachers to use modules in the self-paced method of instruction

8. The capability to modify modules as requested by teachers in health services administration programs not having word-processing systems

As discussed in the conclusions, many teachers participating in this project were interested in developing and sharing modules but one of the inhibiting factors was that this project was really only one person with funding for only one year. The first two recommendations are to create a national center with funding for at least five years to indicate permanence to the participants of the program. A national center is necessary to provide the force to cause the development, maintenance, and exchange of modules. The commitment to develop modules is a commitment to a major effort, a step teachers are not likely to take unless there is some indication that the participating organization will be permanent. So initial long-term funding is recommended for the center.

The center could be directed by a national advisory committee consisting of nationally known representatives from such organizations as Association of University Programs in Health Administration, Hospital Financial Management Association, CONDUIT, Indian Health Services, and the Veterans Administration. Additional representation could come from directors of programs of health services administration and from

teachers of financial management, health economics, and quantitative methods.

The national center should establish an editorial committee and technical reviewers somewhat as commercial publishers establish these committees and reviewers. One of the factors inhibiting the participation of teachers in the development of modules was that they got more "academic" recognition by getting a book published or by getting an article accepted in a refereed journal than they did by producing modules. One of the roles of the committee and the reviewers would be to establish such a scholarly level of quality for the modules maintained in the center that eventually academic recognition would be given to the producers of these modules.

The committee and the reviewers would also review the spectrum of knowledge for which modules were to be developed and coordinate the scheduling and development of the modules to prevent duplication and assure complete coverage.

Eventually, the center should develop such a reputation for excellence that the producers of the modules maintained in the center would get academic recognition for their effort, and teachers would petition the center for the opportunity to submit modules. Initially, the center would not have this reputation, so other incentives to cause teachers to participate would have to be found. One incentive would be to pay teachers directly for accepted modules. Another incentive would be to provide funds for graduate assistance for participating teachers. Another incentive would be to provide training without charge for teachers and to pay royalties as modules are distributed. In any event, incentives would have be found to cause teachers to develop the initial

base of modules, and one of the strongest motivators is some kind of financial reward.

Although the center could be established within one of several organizations, it is recommended that the center be established in a university with a graduate program in hospital and health administration, preferably one making use of self-paced modules. A major reason for this recommendation is the university would be both a producer and a consumer of the modules and provide an immediate testing ground for the modules.

Another reason that the center should be established within a university is the recommendation that the center have access to a large computer in which to store and distribute modules. As discussed in Chapter III and Appendix D-2, the Production System for Architects and Engineers (PSAE) expects the number of its clients with word-processing systems to increase and for the capability of these systems to increase dramatically in the next few years. To take advantage of this development, PSAE is planning to put its master set of specifications into a large computer in "read only" files, update and maintain these master files, and permit their clients to use their word-processing systems to copy any or all of them as needed. This same potential exists for the learning modules in a national center.

Although authors may cringe at first thoughts of having their materials edited, it is recommended that policy of the center permit teachers using modules some latitude in editing the modules so to achieve their objectives with their courses. One of the major attractions of the national center should be that a teacher can get basic materials in machine-readable form and use his program's or the center's

word-processing system to put these materials together to meet his specific objectives. The teacher can delete examples, insert examples, delete sections, insert sections, delete modules, insert modules, and change building names, room numbers, telephone number, and dates. The major restriction would be that the author of the module get credit for his contribution.

An obvious recommendation is that the center have access to the latest word-processing technology, since it is this technology which will permit the efficient development of the modules which can help improve the efficiency and effectiveness of graduate and continuing education in health services administration.

Not only should the center have the capability to distribute printed copies of the modules, it should also have the capability to distribute the modules in machine-readable form so that teachers can take advantage of the policy permitting them to edit the modules used in their courses. To provide this service to a wide range of programs, the center must have the capability to translate its output to the codes used by any of the major word-processing systems. Since authors will also be inputting materials in machine-readable form, the center must also have the capability to translate input from any of the major word-processing systems to the code used on the system at the center.

Although one would expect university teachers to be able to write well and to organize material into logical groups, the experience of CONDUIT and the experience of reviewers of requests for government grants indicate that the center should employ the services of an editor to establish and maintain the standard use of English. In addition, the

center should employ the services of an educational expert to assist in organizing the material so as to make learning efficient.

As discussed in the conclusions, one of the requests made by several participants during the workshop and during the counsel sessions was for assistance in learning to develop and to use modules. A major role of the center should be education and training. Since it maintains and uses the latest word-processing technology, the center should provide technical assistance to programs of health services administration in the selection of such systems and provide programs to train teachers and operators in the use of these systems. The center should also provide instruction in the development and maintenance of modules and in the many uses of modules in education, especially in the self-paced method of instruction.

Although center personnel might help directors of programs in health administration search for funds to support word-processing systems, the center need not assume the obligation of making such funds available to the universities. As discussed in the project activities in Chapter III and the conclusions of this chapter, the use of word-processing systems is spreading and it is only a matter of a few years until all the graduate programs in health services administration have access to such systems. In the interim, the center could provide word-processing services in the editing of modules to teachers not having access to such services. The teacher could identify the desired changes of a printed copy of a module, and the center would make the changes and send the revised copy to the teacher.

Review of Recommendations

by

James Johnson

Director, CONDUIT

This review seeks to assess the recommendations for a national center for health services modules and to offer suggestions for the development of a center. The perspective is from developing and operating a national center, CONDUIT, for the dissemination of computer based educational materials for higher education.

The similarities between CONDUIT and the proposed center are obvious. Both seek to reform teaching practices and stimulate innovation through the sharing of modules, both are focused on higher education, and both are generated from within the academic community. Dissimilarities are likely to be less obvious. It seems reasonable, however, to build on the lessons of eight years experience and success that saw over 4,000 orders delivered to 500 institutions in all fifty states and eight other countries last year.

This review doesn't assess the need for improvemment in education in health services administration nor does it strive to evaluate the effectiveness of the modular approach to teaching. It assumes both. Nevertheless, after viewing the enthusiasm of workshop participants and talking to health care faculty members from around the country, I'm convinced that a need does exist. This need is intensified by research pressures that allow little time for local development, rapid change in course content, and wide differences in the basic mathematical and verbal skills of students.

Assessment

During the past several years, I've been asked to evaluate the feasibility of dozens of proposed centers for sharing educational materials. I've also assisted a few of these projects in getting started. The outline of a national center contained in this report is the soundest proposal I've seen. It demonstrates an accurate feel for the problems of a center and it is on-target in seeing the need for quality and recognizing that a long time is needed for development of the center.

Focus on Quality. Most proposals for national centers for sharing curriculum materials, or anything else for that matter, seek to set up a clearinghouse containing everything that is available. Problems in this approach are several: (1) there are too few materials initially, (2) each holding in the clearinghouse requires a large investment by the center, (3) use of a holding, even in a test situation, takes considerable effort by the instructor, and (4) lack of quality standards does nothing to stimulate the inflow of materials because there is no recognition to authors. These problems create a status quo cycle in the use of materials beginning with the lack of modules and ending with the absence of incentives for creating modules. Thus, materials continue to be locally produced for local use, they are not tested and polished by widespread use, and they seldom build on the work of others.

In the short-run, selection by peer review, actual teaching results, and established center standards reduces the number of modules available for use. In the long-run, selectivity serves to increase the number of modules in the center because it offers author recognition. An item held in a clearinghouse or repository, costs resources to put it in a catalog, to keep records of transactions, to standardize its

format, and to fill orders. It makes sense to expend resources only on materials that are correct and hold promise of being effective. Integrating a module into a course requires considerable effort by the instructor. Notes, assignments, and tests must all be changed. So again it makes sense to put effort into modules of accepted quality. Instructors will not long use materials that result in failure. All of this suggests abandoning a caveat emptor approach and focusing on quality. Unfortunately, developing a reputation for quality takes time.

Need for Time. Despite avowed zeal for new teaching methods, all recent innovations taken together represent a very small portion of actual teaching practice. Any effort to share, or disseminate, new methods is decidedly a bootstrap endeavor. A center is needed not because there is little sharing, but because there is no sharing; the mechanisms for sharing don't exist. They must be created or stimulated. Creation of mechanisms for identifying, reviewing, packaging, and distributing modules is likely to be a time consuming, iterative process. But it is fast compared to the time needed to cultivate sources of modules and build a large group of users. Our experience suggests that at least five years is needed before such a center as proposed here could begin to be a self-sustaining operation.

Five years is not an arbitrarily selected period. It assumes that the health service administration community is somewhat less diffused than the academic community as a whole, and that it is slightly more receptive to change than the rest of academe. These assumptions may not be valid since topics from several disciplines are brought to bear on the study of the delivery of health care services, and courses are taught in several different departments. Also to the degree that

faculty feel heavy research pressures rather than teaching pressures, the five year estimate is optimistic.

Because it recognizes the importance of quality in stimulating the development and use of modules, because it sees the need to prime the pump to nurture development of high-quality modules, and because it is realistic about the problems and time inherent in setting up a center, the proposed center has a solid base. Two other ingredients for success are a genuine need for the services of the center and a forceful leader who has the vision to look years ahead, the patience to wait, and the faith to convince others. All I see and hear point to a real need for a center for sharing modules in health services; and in Tee Hiett the center has a founding leader of the necessary character. I strongly endorse his conceptualization of the center.

Suggestions and Observations

What follows are some random and highly personal observations which may help in determining the role and operation of a national center. They are not intended as assessments of current plans.

Quality. Since the center must build a reputation for quality, all publications, brochures, presentations, and products must show care. Editing, design, and layout are crucial. For many high volume items, typesetting is not much more expensive than less impressive methods. Proper design and layout may use more paper but they do provide greater impact than non-designed work. Emphasizing quality pays the side benefit of increasing esprit de corps.

Goals and Time. Because it will take a long time to see results, good management and funding agencies dictate setting subgoals. These subgoals must be flexible and not the ends in themselves. The goal of

improved instruction through use of modules as measured by actual use is the ultimate test and it must not be forgotten.

Experimentation. The center will have to try many different approaches to problems. It will also have to find workable answers to many questions. Some are: What is the optimum size of a module? What is the appropriate content of a module? How much revision should be expected? What are key topics to be sought? How can reviews be made reliable and valid? What is the best form for distribution? Tests need to be devised and used with a small group of schools to find answers. Allow enough time for testing and don't test on the general audience. This need for intensive testing and development is one aspect of this business that causes commercial publishers to shy away.

Models. Perhaps the most important product of this project will be models for the development of modules. Few potential developers know what a module should look like and what it should contain for widespread distribution. The center will need author's guides and samples. The center also will have to create models for dealing with copyright issues so that copying and revision is permitted while property rights of authors are preserved.

Word Processing. Word processing is a powerful tool that may make modules economically feasible, but it is only a tool. The center should be free to adopt any technique that promises to reduce development time and costs. Keep in mind that an important distinction exists between development systems and delivery systems. A development system may be complex and use sophisticated techniques that reduce development time. A delivery system should be portable, widely available and

cheap. Consider, for example, a printing plant as a production system and a book as a delivery system. The lessons are clear.

National Character. While it may be important that the center be at an established institution, the project must have an identity distinct from that institution. It should have a national character and a national charter. Protection of the national charter can be provided by an advisory board. Management of an advisory board is a difficult task; a director must be able to convince and persuade a diverse board and yet maintain a single voice and a single vision. It is a difficult fence to straddle. Also, the center should avoid cumbersome organizational structures that diffuse power, responsibility, and effort.

Development. Avoid development of modules from scratch. It is a time consuming, nail biting endeavor with a low success rate. Instead, identify and use what others have developed and tested in actual classroom situations. Making these modules suitable for national distribution will be a large enough effort, at least as large as the initial development. In many cases the center's effort of getting things in print will be reward enough for the author.

Role of Authors. Initially authors will do little to polish their work. As the center establishes a reputation, authors will do more but then the center's standards will go up, so effort will remain constant. For example, the center may be able to demand graphics or more exercises or pre and post tests.

Expect a Frustration Trap. Initially it will be difficult to get modules because the center will have no market. It will have no market because it has no materials. Beg, borrow, and sweat materials until a

critical mass is reached. If the center is lucky, the critical mass will recreate itself.

Marketing is the Final Barrier. The free enterprise system, with its millions of salespeople, is a powerful disseminator of innovation. Without an established sales force, the center must rely on workshops, direct mail, sampling, local representatives, and advertising. Workshops are self-selecting, expensive, but also effective. Direct mail can be effective with the proper materials. So can sampling. Local representatives at member schools can be effective but they are difficult to motivate. Advertising doesn't work without a mass market. Once a market is established, the center will become attractive to marketing firms and the founders can again focus on research and development.

Direction of Module Content. Initially modules will be flexible and require faculty involvement in their course use. However, my guess is that over time modules will become more student-centered with self-administered pre and post tests. This will facilitate their use in continuing education and in PSI courses. A major barrier to PSI today is management. In the future, this management burden may be shifted to the students and to computers.

Summary and Conclusions

This proposal for a national center is unusually well thought out. It focuses on the right issues and demonstrates an uncanny understanding of the problem facing such a center. From the perspective of a developer of a successful center, I highly recommend it. In working out the details of a center, the founders should build on the work of others. The record of this project here is admirable and should be continued by the proposed national advisory board.

Appendix A. Report of Workshop Consultant

by

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The consultant to the workshop was charged with observing the workshop and especially the reactions of the participants, organizing his findings and recommendations into a report to be included with the workshop proceedings, and drafting the proceedings. In this reporton findings and recommendations begins with a brief review of some of the current and dramatic changes in education leading to Personalized Systems of Instruction (PSI)and then examines some of the reported research illustrating the effectiveness of PSI, a concern expressed by several participants at the workshop. These two sections describe the effectiveness and efficiency of PSI. The next section is an examination of the importance of modern word-processing technology to the development and maintenance of PSI materials, a major point of the workshop. The report concludes with recommendations for additional programs to sustain the effort of the National Workshop.

Changes in Education

The last 15 years have been an exciting period for education. During this time new instructional procedures have been designed and empirically tested which can lead to more effective and efficient instruction. Many of these procedures have developed as a response to the now-familiar problems facing educators at most institutions of higher education, including professional schools: increasingly large and di-

versified student populations, rapid growth in the amount of knowledge to be learned, continuing decline in resources allocated to education, and demands for increased educational accountability in the face of rising educational costs to students and society. None of these pressures is expected to decrease in the foreseeable future, which compels educators, including those in health services administration, to become familiar with effective educational options that are now available. The enthusiastic willingness on the part of the participants at the National Workshop to accept this new challenge was truly outstanding.

Along the most promising of the new educational developments of recent years are those which have become known as "systematically designed" instruction, of which "personalized" instruction (PSI) is one type. Systematically designed instruction involves:

1. The careful specification and analysis of learning objectives and materials
2. The development of appropriate teaching methods to allow students to meet these objectives
3. The design of appropriate evaluations and feedback techniques to measure student learning
4. Frequent monitoring of student progress, with subsequent revision of instruction and/or materials where needed
5. An understanding of the interrelationship of the four prior components

All of the above implies a dramatic change in the "traditional" conception of teaching. The major role of the teacher is no longer one of transmittal of information. The information function is better served by well-designed instructional material, as Dick and Carey (1978) have noted:

Appendix A. Report of Workshop Consultant (Continued)

> If education is to meet the needs of individual students through the provision of appropriate knowledge and training in important skills, there must be increased dependence upon well-designed, effective instruction. Teacher-dependent, group-paced instruction can no longer serve as the primary model for the teacher. Conversely, teachers have been, are, and will continue to be designers of at least some of their own instructional materials..... It will become more important for teachers to have technical skills that will enable them to design and implement instruction... (to) enhance each teacher's ability to select such materials wisely. (p.4)

Any assistance the teacher can receive in this effort such as the program discussed at the National Workshop, can only enhance effective teaching efforts. Relieved of the repetitious task of presenting basic information, the classroom teacher is free to indulge in more of the "art" of his or her craft, such as assisting students who are having difficulty, challenging students who are advanced, and presenting interesting (albeit peripherally related) topics. In short, the careful use of systematic instruction should yield effective and enjoyable learning for both the students and the teacher. The teacher's job becomes one of arranging the conditions for effective learning. As indicated by reported research, PSI is one means of improving the effectiveness and efficiency of education.

Effectiveness of PSI

Numerous empirical studies have documented the effectiveness of PSI in a wide variety of educational settings (Hursh, 1976; Kulik, 1976; Kulik, Kulik, S. Carmichael, 1974; Kulik, Kulik, S. Smith, 1976; Robin, 1976; Ryan, 1974; Taweggin, 1976). Many of these reviews have addressed the important issues raised by the participants at the National Workshop

Appendix A. Report of Workshop Consultant (Continued)

(such as retention, application, higher-order learning, and effects upon study skills) demonstrating personalized instruction's superiority in a majority of instances.

Effectiveness of instruction can be measured by several variables: end-of-course performance, retention, performance in subsequent courses, student attitudes, and student aptitude. Each of these variables will be discussed briefly.

End-of-course Performance

Kulik, Kulik, and Smith (1976) report 39 studies of the end-of-course performance of students in Personalized System of Instruction (PSI) and lecture courses. In 38 of the 39 studies, performance was better in PSI, and in 34 of the studies, the difference in performance between the two methods was statistically significant. In one case, student performance at the end of the course was slightly better in lectures (although the difference did not approach statistical significance).

Retention

Kulik, Kulik, and Smith located nine studies which investigated retention of course material over intervals ranging from 3 weeks to 15 months after the final examination. In all nine studies, PSI students performed better than lecture students on the follow-up examination and in each case the difference was significant. The authors note:

> In most of the studies, differences at the time of follow-up were greater than final exam differences. If anything, final exam comparisons underestimated the magnitude of PSI's effect; these 9 studies strongly suggest that PSI promotes something more than rote memorization. Rote learning of

> disconnected facts and bits of information usually fades quickly. The superiority in performance of PSI students lasts, and in fact seems to become clearer as the months pass. These studies suggest therefore that PSI is useful not only in the teaching of factual information but also in the teaching of meaningful concepts and applications. (p. 24)

Performance in subsequent courses

Five studies were found in which researchers investigated the performance of PSI and lecture students in a second course taught conventionally. In each study, PSI students outperformed other students. There are several possible reasons for the performance difference: (1) PSI students may have demonstrated mastery of previous course content related to the subsequent course content; (2) PSI students may be more confident and interested in the second course because of their success in the earlier PSI course; (3) PSI students may have improved their study skills in mastering material in the PSI course. The authors note that, although there is insufficient research information to select the correct hypothesis at present, these results seem to support the results of the retention studies, i.e., that PSI may be responsible for learning beyond rote memorization. Student attitudes: Kulik, Kulik, and Smith located nine studies comparing student ratings in PSI courses and conventionally taught courses. In eight of the nine cases, PSI ratings were significantly higher than those from lecture courses. They also report a series of studies at the College of Engineering, University of Texas at Austin in which students were asked to compare their PSI courses to other courses they had taken in college. Approximately 70 percent of the students considered PSI better than the lecture approach;

about 20 percent considered the two methods about equal; and about 10 percent preferred the lecture method. Other investigators have used open-ended course evaluation forms to assess student attitudes. After analyzing published reports, the authors found that only one or two students in a typical class of 50 react negatively to the PSI format.

Student Study Time

Kulik, Kulik, and Smith report two types of research on study time, self-report studies and observational studies. They note that student self-reports at the end of courses suggest that students put more time and effort into PSI courses. For example, in Koen's (1970) PSI course almost 90 percent of the students reported that the work requirements were greater than for a comparable lecture course; the remaining 10 percent stated that the work requirements were the same. Kulik, Kulik, and Smith report slightly different results when students report their study time on a weekly basis rather than at the end of the semester. They report two studies which show that PSI students and lecture students spend about the same amount of time in each type of course. Born and Davis (1974) placed all course materials in a special study center and required that students enrolled in PSI and lecture sections of their course do all studying in the center. They noted time of entry, materials requested, and time of exit of each student. The average time requirement for the course for the PSI students was 45.5 hours; the average course time for the lecture students was 49.2 hours (including study and lecture time). Thus, weekly self-report data seem to agree with the research.

Appendix A. Report of Workshop Consultant (Continued)

PSI and Student Aptitude

Kulik, Kulik, and Smith report two studies investigating the relationship between student aptitude and end-of-course performance. In a study by Austin and Gilbert (1973), PSI was found to be more beneficial for low-aptitude students; high-aptitude students would have done almost as well in a lecture course. In a study by Kulik, Kulik, and Milholland (1974), PSI was found to be more beneficial for high-aptitude students; low-aptitude students would have done almost as well in a lecture course. Kulik, Kulik, and Smith note that each study is supported by other studies with similar results. Apparently the question of who is helped more by PSI depends on the course, materials, and procedures used. Kulik, Kulik, and Smith note that so far no group of students seems to be hindered by PSI. Research has not yet located a subgroup of students for whom PSI is less effective than conventional teaching.

Other Concerns Expressed at Workshop

PSI has also addressed other concerns that were voiced at the National Workshop. For instance, it has proven to be an effective, time-efficient method for producing mastery learning, especially among students with diverse academic backgrounds. Given the rapidly expanding information base in the health fields, and the relatively short curriculum time allotted to health students, the need for efficient and effective instructional methods appears obvious. Second, personalized instruction has been shown to be a method that increases the amount of both student study effort and student satisfaction with their learning experience. This component has strong implications for student benefit,

not only in their academic experience but also in terms of engendering the lifetime "love of learning" which is so important to those in the health care field.

PSI and Word Processing

The principles underlying PSI are perhaps most closely related to the principles involved in the design of effective "self-instructional" materials, with one important difference--the use of proctors. Good self-instructional materials incorporate careful specification of objectives and opportunities for active responding by the students, as well as flexible pacing. However, even the best instructional materials will contain some errors, ambiguities, and information which is already out-of-date. It is at this point that the importance of word-processing technology enters the picture.

The development, maintenance, and sharing of instructional material has been the most limiting aspect to the widespread growth of personalized instruction. Effective instructional materials are time-consuming to develop, and few teachers feel comfortable adopting another teacher's classroom material in toto. Publishers, as businessmen, are not interested in marketing materials for which they cannot be guaranteed a large market. In order to assure a market of this size, instructional materials have to be "watered down" to the point where their effectiveness becomes questionable. Besides, foreseeable economic pressures upon publishers almost insures that this situation will be exacerbated in the future. Of all the technologies that have been developed in recent years, word processing holds promise for future utility to the

Appendix A. Report of Workshop Consultant (Continued)

classroom teacher. As Hiett (1979) has noted (see Appendix F for full report):

> Modern word-processing technology has considerable implication for the development of teacher-crafted learning units and for PSI (Personalized Systems of Instruction). Such technology can be used directly in the development and maintenance of each teacher-crafted unit. The technology also provides a basis for the sharing and exchange of such units among teachers while retaining for each teacher the efficient capability of editing each unit to meet his objectives, a potential which will provide each teacher with sufficient modules to permit personalizing instruction.

Recommendations

In my seven years of professional association with personalized instruction and the Center for Personalized Instruction, I have rarely seen a project with more promise. More importantly, perhaps, at the National Workshop I had the privilege of meeting a group of participants who could obviously turn this promise into reality, under the able direction of Dr. Hiett. To me this was evidenced in many ways, including the activity and productivity of the groups, as well as the more difficult to measure professionalism and dedication that was apparent to even the casual visitor. One final indication of the sophistication of the group was the list of questions generated (see previous section) by the participants. These are important questions which educators should answer, not only in health services administration but all levels of education.

Given the attitudes expressed, I feel it is important to begin to build upon the momentum developed at the National Workshop. The next steps appear to be to secure adequate resources, identify a group of

Appendix A. Report of Workshop Consultant (Continued)

faculty who are interested in developing modules (from as many campuses as possible), and train this group in instructional module development. Once a core group of modules are developed and demonstrated to be effective, the National Center can begin operations. I personally would advocate a slow, controlled growth, with a strong emphasis upon quality as opposed to quantity; it is easier to build upon past successes than to try to correct past errors. If the National Center can maintain this philosophy, I firmly believe that demonstrable educational needs will more than maintain sustained growth.

Appendix A. Report of Workshop Consultant (Continued)

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Appendix B-1. Universities Invited and Participating

Name of University Invited	Number of Attendees	Visited
Arizona State University	1	yes
University of California-Berkley	1	yes
University of California-Los Angeles	0	-
University of Cincinnati	2	-
University of Colorado Medical Center	2	yes
Duke University	2	-
Governors State University	3	-
The George Washington University	2	yes
University of Iowa	2	yes
University of Massachusetts--Amherst	2	-
Medical College of Virginia-- Virginia Commonwealth University	2	-
Meharry Medical College	1	-
University of Minnesota	1	-
University of North Carolina	1	-
University of Pittsburgh	1	-
University of Rhode Island	2	-
University of South Carolina	1	yes
University of Texas-Houston	3	-
Tulane University	0	-
Union College	1	yes
University of Washington	3	yes
The University of Wisconsin	2	yes
Yale University	0	-
Total	35	9

Appendix B-2. Names and Addresses of Workshop Participants, Visitors, and Consultants

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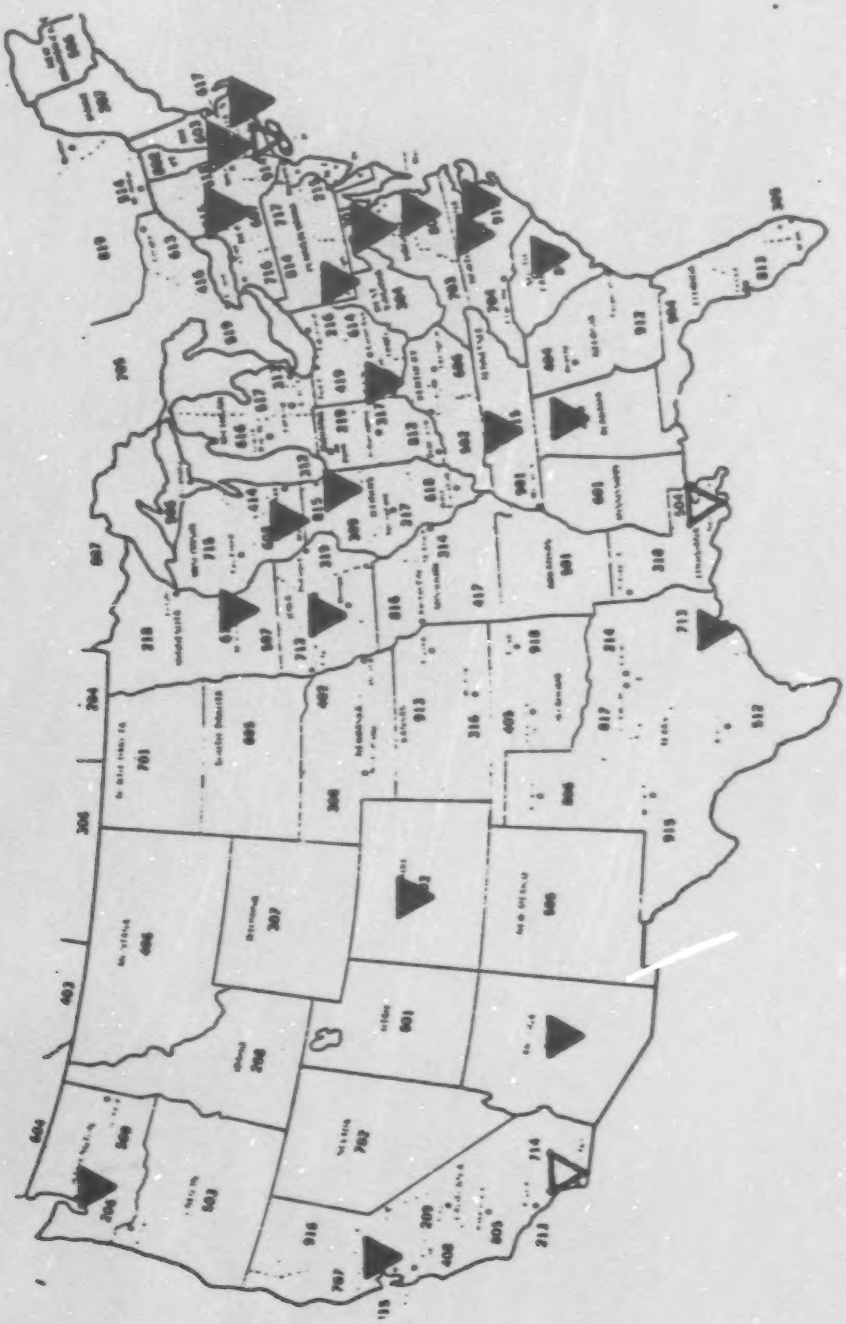
Appendix B-3. Map Displaying Geographical Dispersion of Project Participants



Appendix C-1. Agenda for National Workshop

AGENDA FOR NATIONAL WORKSHOP

on

DEVELOPING, MAINTAINING, AND SHARING LEARNING MODULES

in

QUANTITATIVE METHODS AND FINANCIAL MANAGEMENT

in

HEALTH SERVICES ADMINISTRATION

March 20-23, 1979

Birmingham, Alabama

Tuesday, March 20, 1979

2:00-4:00 p.m.	Registration
4:00-5:00 p.m.	Welcome and Introductions, Dr. Tee Hiett, and Dr. Howard Houser
5:00-6:00 p.m.	Social Hour, Cash Bar
7:00-9:00 p.m.	Dinner and Overview of Workshop, Dr. Hiett

Wednesday, March 21, 1979

8:30-10:00 a.m.	Learning Modules at UAB, Dr. Hiett
10:30-11:30 a.m.	Word-Processing Technology, Ms. Ruth Hickman
11:30-12:00 a.m.	Word Processing and Learning Modules, Dr. Hiett
12:15-1:15 p.m.	Lunch--group discussions
1:30-2:30 p.m.	A Management System, Dr. Hiett
2:30-3:00 p.m.	Group Assignments, Dr. Hiett
3:00-5:00 p.m.	Group Session I
7:00-9:00 p.m.	Group Session II

Appendix C-1. Agenda for National Workshop (Continued)

Thursday, March 22, 1979

8:30-10:00 a.m.	Diagnostic Tests, Modules, and Computers; Mr. Robert M. Smith
10:30-12:00 a.m.	The CONDUIT Experience and Its Implications for this Project, Mr. James Johnson
12:15-1:15 p.m.	Lunch--Group Discussions
1:30-3:00 p.m.	Additional Innovations and Reports from Visitors
3:00-5:00 p.m.	Group Session III
7:00-9:00 p.m.	Group Session IV

Friday, March 23, 1979

8:00-10:15 a.m.	Group and Individual Reports
10:45-11:15 a.m.	Consultant's Report, Dr. Stephen F. Bono
11:15-12:00 a.m.	Summary, Conclusions, and Future Plans, Dr. Hiett
12:15-1:15 p.m.	Lunch
1:30-5:00 p.m.	Follow-up and Tour

Appendix C-1. Agenda for National Workshop (Continued)

Description of Agenda Topics

The workshop begins with registration and an informal welcome on Tuesday afternoon, March 20. Formal welcome and introduction of all participants, visitors, and guests at 4:00-5:00 p.m. will be followed by a social hour. Dinner in the evening will include a review of events leading to the workshop, an overview of the workshop, and a discussion of the primary objectives of the workshop.

The first session on Wednesday will be devoted to an examination of the organization and the format of the module as developed in the School of Community and Allied Health (SCAH) at the University of Alabama in Birmingham (UAB). This session will be organized around modules for accessing a central computer through a remote terminal and entering, editing, and manipulating data in the computer and on modules for entering, editing, and manipulating text in a word-processing system. These modules will be used by participants in the group sessions during the late afternoons and evenings on Wednesday and Thursday.

The second session on Wednesday, 10:30-11:30 a.m., will be devoted to an examination of the more important characteristics of modern word-processing technology. Ms. Ruth Hickman, who has had several years experience with word processing with WANG Laboratories, will discuss the evolution, practice, and future of word processing. In the final session before lunch, Dr. Hiett will review the applications of word-processing technology to the development and maintenance of learning modules.

In the four group sessions in the late afternoons and the evenings on Wednesday and Thursday, the participants will work in small groups of five members each. Each group will be scheduled for four different sessions. Two of the sessions will be devoted to word processing in which the participants will use self-paced modules and practice at a workstation on a word-processing system. During these sessions, the participants will enter, edit, and move text around on the system. They will also access the main word-processing system in the SCAH building, copy one or more modules from that system, and edit the modules at their workstation. A third session will be devoted to the use of modules on a data-processing system (the traditional use of computers). The participants, using the modules, will access the central computer at UAB, enter data into the computer, edit the data, and use the Statistical Analysis System (SAS) to perform analysis on data stored in the computer. A fourth group session will be devoted to developing a list of topics for which modules could (and should) be developed. The list from each group will be collected on Friday morning and organized into a master list which will be sent to all participants

Appendix C-1. Agenda for National Workshop (Continued)

following the workshop. Groups will also have discussion sessions during lunch on Wednesday and Thursday. Group assignments will be included in the packet of materials given to the participants upon their arrival.

Following lunch, the fourth session on Wednesday, 1:30-2:30 p.m., will be devoted to a review of the evolving management system used with the self-paced modules at UAB. This session will also include some review of the literature relating to the use of self-paced materials.

The first session on Thursday, 8:30-10:00 a.m., will be an examination of the potential use of diagnostic tests and modules to provide a truly personalized system of instruction. With a large number of modules stored in a computer, it is possible to give students a diagnostic test, to enter test results into the computer, and to have the computer print specific lesson plans for each student based upon his achievements on the test. This process, which is being implemented in some educational programs today by Mr. Robert M. Smith, can be used with the self-paced learning modules being discussed at this workshop. Mr. Smith will review his work and discuss the extension of this effort to graduate education.

The second session on Thursday, 10:30-12:00 a.m., will be a presentation by Mr. James Johnson about this project and about CONDUIT, the organization he directs. Recognizing the need for the dissemination of computer materials designed to improve undergraduate education, the directors of five university computer centers organized CONDUIT in 1971. The objective of the organization was to collect, edit, and disseminate materials to increase efficient use of computers in university education. With support from the National Science Foundation, the organization has gone through three phases of development. Mr. Johnson will discuss these phases with the participants and give his views on how the program begun at this workshop might best proceed.

In the third session on Thursday, 1:30-3:00 p.m., Dr. Hiett will discuss additional innovations related to developing, maintaining, and sharing learning modules. During this session, visitors will be invited to comment on the workshop and the program.

The first session on Friday, 8:00-10:30 a.m., will be devoted to a presentation by each of the small groups of participants. Each group will be asked to share their views, thoughts, and recommendations. Also during this session, each individual at the workshop will be given the opportunity to share his experiences, views, and recommendations with all participants.

In the second session on Friday, 10:45-11:15 p.m., Dr. Stephen F. Bono, of the Department of Family Practice at the Medical College of Georgia, will summarize what he has heard at the workshop and make

Appendix C-1. Agenda for National Workshop (Continued)

recommendations for future actions. Dr. Bono has had considerable experience with curriculum development, especially with personalized systems of instruction (PSI).

In the final formal session on Friday, 11:15-12:00 p.m., Dr. Hiett will provide a summary of the workshop and give an overview of the plans for the immediate future.

Friday afternoon will be reserved for a tour of the facilities of the School of Community and Allied Health with emphasis on the implementation and use of the word-processing system. Dr. Hiett will be available during this time to meet with individuals or groups interested in additional discussion.

Appendix C-2. Members of Workshop Groups

Members of Group 1

Mark A. Covaleski, Ph.D.	University of Wisconsin
John A. Holder, CPA	University of California-Los Angeles
Eileen A. Tynan, Ph.D.	University of Colorado Medical Center
Olga Quintana, D.B.A.	George Washington University

Members of Group 2

Stanley Lemeshow, Ph.D.	University of Massachusetts Amherst
William B. Neser, Ph.D.	Meharry Medical College
Donald S. Smith, II, Ph.D.	Duke University
Patricia W. Wahl, Ph.D.	University of Washington

Appendix C-2. Members of Workshop Groups (Continued)

Members of Group 3

Robert A. Cornesky, Sc.D.	Governors State University
Polly Feigl, Ph.D.	University of Washington
Donald S. Holmes	Union College
Russell C. Koza, Ph.D.	University of Rhode Island
Richard J. Oszustowicz	University of Minnesota

Members of Group 4

Roger Kropf, Ph.D.	University of Massachusetts Amherst
Sang-O Rhee, Ph.D.	Governors State University
Marvin D. Strauss	University of Cincinnati
Frank G. Williams, Ph.D.	Arizona State University

Appendix C-2. Members of Workshop Groups (Continued)

Members of Group 5

S. M. Hai, Ph.D.	Medical College of Virginia
Brian T. Malec, Ph.D.	Governors State University
Franklin L. McCarthy, Ph.D.	University of Pittsburgh
James D. Suver, D.B.A	University of Colorado Medical Center
William N. Zelman, Ph.D.	University of North Carolina

Members of Group 6

Robert L. Ludke, Ph.D.	University of Iowa
Ramesh Kumar Shukla, Ph.D.	Medical College of Virginia
John V. Strand	University of California--Berkeley
Vandankumar M. Trivedi, Ph.D.	University of Washington
Dorothy M. Tuttle, Ph.D.	University of Texas-Houston

Appendix C-2. Members of Workshop Groups (Continued)

Members of Group 7

David F. Bergwall, D.B.A.	George Washington University
Michael Decker, Ph.D.	University of Texas-Houston
B. Jon Jaeger, Ph.D.	Duke University
Alton C. Johnson, Ph.D.	University of Wisconsin
Jay Wolfson, Ph.D.	University of South Carolina

Members of Group 8

Charles P. Armstrong, Ph.D.	University of Rhode Island
Bobbe L. Christensen, Ph.D.	University of Texas-Houston
Gary Levitz, Ph.D.	University of Iowa
Joseph D. Bakan	University of Cincinnati

Appendix C-3. Group-Generated Topics for Modules

1. Alternative financing arrangements
2. Analysis of transactions and journal entries (including closing, adjustments, and preparation of financial statements)
3. Application of word processing to health care organizations
4. Basic economic concepts for health administrators
5. Basic operations research methods and applications
6. Basic organizational theory and behavior (organizational design and structure, communication, leadership motivation, organization development)
7. Basic statistical techniques (descriptive and inferential statistics)
8. Budgeting
9. Budgeting in nursing
10. Capital investment/capital budgeting techniques
11. Cash flow management
12. Cost behavior (high, low, and regression)
13. Cost-benefit analyses (from economic, institutional/financial, and managerial points of view)
14. Cost capital
15. Cost classification
16. Cost finding
17. Cost variance analysis
18. Cost/volume/profit analysis

Appendix C-3. Group-Generated Topics for Modules (Continued)

19. Debit flow management

20. Demand simulation (Monte Carlo analysis)

21. Diagnosis and prescription in the quantitative method sequence

22. Epidemiological problem sets and data analysis

23. Financial statement analyses (use and meaning of ratios)

24. Flexible budgeting

25. Forcasting volume (regression analysis)

26. Fund accounting and interfund transfers

27. Hospital administration and management

28. Inventory control

29. Inventory control models

30. Logistic regression

31. Marginal analyses

32. Operations research

33. Overview of public health and medical care organizations

34. Payroll model

35. Personnel records and control

36. Present value analysis

37. Present value analysis (leasing versus purchasing)

38. Rate determination simple case and complex rate setting model)

39. Reading, writing and communication skills

Appendix C-3. Group-Generated Topics for Modules (Continued)

40.	Refunding of debt issues
41.	Risk analysis
42.	Sampling
43.	Scientific writing
44.	Selection and/or training of effective managers and administrators
45.	Use of input-output models in the health care sector
46.	Working capital management
47.	Writing effective objectives

Appendix D-1. CONDUIT

Although the potential of the use of word processing is just beginning to be realized in educational institutions, it is being used routinely in some organizations. As can be seen in the following brief description, CONDUIT uses word processing to edit documentation for their computer programs. CONDUIT is also an organization which can serve as a model to this project since it stimulates teachers to develop and submit materials which are edited, tested, revised, and made available to other teachers around the world.

CONDUIT was founded by the directors of computer centers at five universities (Oregon State, North Carolina, Dartmouth, Iowa, and Texas. The objective was to organize the dissemination of materials to increase efficient use of computers and university education. With funding from the National Science Foundation (NSF), the organization has gone through three phases of development. The first phase, 1972-1974, was an experiment to identify ways of eliminating barriers to the widespread dissemination of computer materials designed to improve undergraduate education. During this project, the directors acquired, produced, and disseminated some computer-based instructional materials.

With this knowledge of the dissemination process and with additional support from NSF, CONDUIT entered its second phase, the development of a formal dissemination system. During this phase, CONDUIT expanded its staff and refined and developed its procedures for soliciting educational materials, for controlling quality, for packaging the materials, for distributing the materials, and for maintaining the materials.

Appendix D-1. CONDUIT (Continued)

Although CONDUIT may always require some external funding to support development of some materials, it has entered a third phase aimed at self-sufficiency. With rapidly increasing sales of its educational materials during 1979, CONDUIT is on its way to becoming self-sufficient.

Several aspects of CONDUIT can be related to the development, dissemination, and use of student-paced learning modules in quantitative methods, health economic, and financial management in hospital and health administration. Two of the aspects discussed here are availability of material and the impact of word processing.

One of the first questions to be answered in a research project such as CONDUIT is: are there sufficient materials available to justify their organization and dissemination? The experience of CONDUIT indicates that there are sufficient materials available. Three major sources of materials are teachers at universities which are members of CONDUIT, teachers who have funded projects, and teachers who merely develop material on their own. One obligation of contributing members of CONDUIT is to identify material which should be considered for national distribution. This source produces about 20 percent of the programs of CONDUIT. A major source of programs for CONDUIT are projects that have been funded by federal agencies, private foundations, and state institutions. Approximately 40 percent of the programs of CONDUIT are developed from programs originally supported by such institutions. The third major source is individuals who hear about the program at CONDUIT and offer their programs for potential recognition and acceptance. One of CONDUIT's major (but r warding) problems is reviewing the

Appendix D-1. CONDUIT (Continued)

large number of materials being submitted in an expeditious manner. Most authors seem pleased to have their materials recognized and are pleased to be free of the distribution of these materials. The success of CONDUIT indicates that basic materials are available for processing and dissemination.

A second major aspect of CONDUIT is that format organization of existing materials requires considerable editing and testing. This aspect is so serious that CONDUIT developed a 123-page guide for authors and still has an editor to edit each program and its documentation. Even though most of the programs of CONDUIT are computer programs, considerable documentation is required for the implementation and use of these programs. The large amount of editing has led to the use of the ATS word-processing system available on the local computer and to the consideration of other word-processing systems. Mr. Johnson, director of CONDUIT, has indicated that he would be interested in considering the dissemination of the documentation and procedures in machine-readable form somewhat as the computer programs are disseminated in machine-readable form on magnetic tape and magnetic disk.

Appendix D-2. PSAE

Production Systems for Architects & Engineers (PSAE) is an organization developed and owned by the American Institute of Architects (AIA) for the development, maintenance, and dissemination of specifications for architects and engineers. PSAE uses word processing to edit and maintain a master file of specifications for engineers and architects, and clients of PSAE can use word processing to edit and rearrange material from the master file.

As architects develop design concepts, they must translate them into construction documents with specifications for construction. The AIA, recognizing that its members spent much time-consuming effort developing and editing specifications, established PSAE to provide specification services for its members. Since 1969, PSAE has been developing MASTERSPEC, a specification data bank of over 7,000 pages of specialized and technical text. MASTERSPEC is written by technical specification writers and goes through an extensive editing process through the use of the Lanier word-processing system.

For an annual fee, architectural firms and individual architects subscribe to the services of PSAE and receive a reference catalog of the master specifications and a quarterly update, a listing of all modifications in the specifications. Through a separate arrangement, an architect can acquire the specifications in machine-readable form on cassette tapes, magnetic tapes, or diskettes compatible with the Lanier

Appendix D-2. PSAE (Continued)

word-processing system. PSAE has grown so that in the fall of 1979 over 1,350 firms subscribe to its services.

The primary aspect of this organization relevant to this project is its use of a word-processing system to organize, edit, maintain, and disseminate materials on a national scale. The master files are developed by professionals and updated regularly to accommodate changes in technology and in materials and to add additional sections as required. Users of the service can acquire copies of certain sections which can be put directly into a set of specifications or can be edited to meet the needs of the user. MASTERSPEC users estimate that about 95 percent of their project specifications can be taken directly from the master file.

With the specifications in machine-readable form and with its own word-processing system, even a small architect firm can create its own set of specifications by selecting certain segments from the master file and interweaving these sections into the specifications for the client. Thus, word processing is used at PSAE to establish and maintain a master file. Copies of the master files are made available to architectural firms through disk libraries. Word processing is used by an architect in a firm to adapt the master file to his own specific needs.

With the rapid adoption of word-processing systems in even small architectural firms, management of PSAE predicts that within two years most firms will have access to such systems. PSAE plans then to maintain the master file in a large central computer which can be accessed by the word-processing systems in the architectural firms to select only the specification needed. Thus PSAE will have to maintain only one

Appendix D-2. PSAE (Continued)

file, and all clients will have direct and almost immediate access to the very latest technology.

Appendix D-3. Veterans Administration

During the summer of 1972, congress passed legislation establishing Public Law 92-541, the Veterans Administration Medical School Assistance and Health Manpower Training Act which included Regional Medical Educational Centers (RMEC). In the fall of 1979, the VA had six REMC's at the following locations, to serve the region indicated.

1. Minneapolis, MN North Central Region
2. Northport, NY North East Region
3. Salt Lake City, UT Interwest Region
4. St. Louis, MO South Central Region
5. Long Beach, CA South West Region
6. Birmingham, Al Southeastern Region

The primary aspects of the RMEC program relevant to this project are the emphasis on educational programs in each of the regions, the emphasis on word-processing systems and on computer systems in each center, and the emphasis on sharing information among the centers. Although the RMEC's are initially placing emphasis on an Information Management System (IMS) to help manage the information about courses and participants, there is considerable interest in using the word-processing systems and the computer systems to development, maintain, and share educational materials. As can be seen from the descriptions of the objectives, the RMEC's have, as a part of their mission, education related to health services administration. (In fact, about ten percent of the programs of the Southestern RMEC in 1979 were devoted to administration.) Thus they would have an interest in developing, maintaining, and sharing health services administration materials with other

Appendix D-3. Veterans Administration (Continued)

organizations such as Graduate Programs in Hospital and Health Administration.

Equipment

Each RMEC has the following data processing equipment:

1. Tektronix 4051 Graphic System with a 32K RAM and magnetic tape cartridge drive (each tape having a 300K byte capacity)
2. Tektronix 3907 dual Floppy Disc Drive Unit, each disc with 630 + K byte capacity
3. 3M 5500 Optical Scan Reader
4. Texas Instruments Silent 765 Portable Memory Terminal (20K bubble memory)
5. Tektronix 4641 Matrix Line Printer
6. Tektronix 4631 Hard Copy Unit
7. Vadic VA3455 Modem

The Southeastern Regional Medical Education Center (SRMEC) will be sharing facilities with its host hospital which has a PDP 11/20 and a PDP 11/70 using the RSTS/E operating system. These systems may be accessed by hard-wire and dial-up facilities. The DATATRIEVE data base system has recently been implemented on the PDP 11/70 which may be available for back-up and consolidation of regional data bases.

Objectives of the SRMEC

Objectives of the RMEC's can be implied by reviewing some of the objectives established by the SRMEC.

The primary objective of SRMEC is to support the development and maintenance of the highest possible quality of patient care with an appropriate scope of continuing medical education to meet the training

Appendix D-3. Veterans Administration (Continued)

needs of professional and paraprofessional VA personnel. This objective can be can be further defined for each of the following professions.

1. Continuing Education for Physicians - Identify new medical modalities and provide educational support to achieve and maintain high standards of modern medical care through coordination of planning on a facility, district, regional, and national basis

2. Continuing Education for Dentists - Identify modern dental modalities and provide educational support to achieve and maintain high standards of dental care through efficient utilization of advanced technology and staff

3. Continuing Education for Nurses - Identify and assist in meeting nursing continuing education priorities with focus on the acquisition of new knowledge and understanding of disease processes and the means to correct or minimize health disabilities and on the exploration of better methods to apply these measures to patients

4. Continuing Education for Allied Health - Identify and assist in meeting allied health education priorities. Provide opportunities for "Hands-On" experience for allied health personnel in the areas where this type of training is relevant and necessary to achieve and maintain technical expertise.

5. Continuing Education for Administration - Develop educational programs to assist in the training of management/supervisory personnel with emphasis on the improvement of planning, decision-making, and leadership capabilities

Operational sub-goals of SRMEC include:

1. Identify resource people throughout the VA system and in the community to assist in training

2. Develop training programs to meet identified needs through the utilization of resources within the RMEC's, VA system, and community

3. Provide quality teaching/training aids through efficient and effective utilization of RMEC audio-visual teams, medical media, and Learning Resource Centers

4. Develop a communication network via VACO, RMEC's, region, district, facility, community, and individuals

Appendix D-3. Veterans Administration (Continued)

5. Improve communications among RMEC's through exchange of newsletters, program announcements, and individual contact

Information Management system (IMS)

One of the aspects of the RMEC program relevant to this project is the use of word processing and computers to develop and maintain an Information Management System (IMS). A plan for the design, development, implementation, and evaluation of an IMS involving a three-tiered approach over a period of five years is currently being developed. During the first two years, first-tier efforts will focus on immediate logistical, administrative, and educational information management applications within and among the RMEC's and the VA Central Office (VACO).

During the second and third years, second-tier efforts will focus on extending applications to other components of the Continuing Education Network (CEN). During the fourth and fifth years, third-tier efforts will focus on special management and educational applications which enhance individual, cooperative, and inter-independent activities of the entire CEN.

The IMS will encompass programs and data files for use in registering, processing, and documenting attendance in continuing education activities; in managing, controlling, and reporting budgets; in developing periodic management and administrative reports; and in processing educational data related to needs assessment and program evaluation.

The IMS will:

1. Make a matter of record useable information related to educational activities and administrative operations

Appendix D-3. Veterans Administration (Continued)

2. Store the records in common formats which make the information easily accessible and manipulable

3. Establish a network of data files which links related records, reduces data redundancy, and increases the potential for storage, processing, and output of new types of data and information as needs arise

4. Maintain a core data base for logistical, administrative, fiscal and educational data processing

5. Provide a set of routines which store, process and produce a variety of documents for logistical, administrative, fiscal, and educational operations

6. Optimise the use of manual and/or automated data storage and processing technologies

The information provided by the computer-based IMS will:

1. Increase staff productivity by reducing the amount of routine information and data processing done manually

2. Improve the availability and timeliness of information for effective management of educational programs and activities

3. Improve the availability of information for development of CE programs and activities

4. Increase the capability to apply new technologies in program management, educational design, and data analysis

5. Increase the capability to respond to the multi-level information and data needs and requirements of the CE system

6. Establish a common data base for program evaluation

7. Provide the information systems support necessary for educational accountability

Appendix D-4. Indian Health Services

Two major programs of the Indian Health Services (IHS) relevant to this project are the use of the informational network in the Tribal Resource and Assistance Information System (TRAIS) and educational and training mission of the Tribal Management Support Center (TMSC). TRAIS is a network information system involving word-processing systems at each tribal center, each IHS headquarters, and IHS area office, and a large central computer. All the word-processing systems can communicate with each other and with the central computer.

A major service of the TMSC program is training for Tribal and IHS personnel in subjects in health systems management and administration. The goal of TMSC training is to further the capabilities of Tribes and Tribal organizations to administer health programs and to continually upgrade, through training, the administrative competencies of IHS personnel. TMSC Training Services has developed a comprehensive continuing education program featuring a flexible curriculum design, training with direct application to daily job performance requirements, Continuing Education Units (CEU's), and interfacing potential with health administration and other degree programs at selected colleges and universities throughout the United States.

A brief descriptions of each of these programs is presented here.

Tribal Resource and Assistance Information System

TRAIS serves three functional areas: Tribes, Indian Health Service Headquarters, and Indian Health Service Area Offices.

Appendix D-4. Indian Health Services (Continued)

The tribes will be provided the opportunity to interface with the system at their option. The system will provide information on contracting and guaranteeing procedures, rules and regulations, methods for acquiring and administering contracts and grants, monitoring of contracts and grants, performance evaluation, lists of consultants available to tribes, Indian Health Service technical assistance information, training and other related subjects.

IHS Headquarters, through TRAIS, will be provided a management information system for the instant reporting on all funding and support activities related to tribes and other organizations. The system will provide up-to-date information on all contracts, grants, InterAgency Personnel Assignments (IPA's), Memorandum of Agreements (MOA's), funding allocations, consultants, tribal organizations, rules and regulations, etc.

IHS Area Offices, through TRAIS, will be provided a method for standardization of the contracting and granting process; sophisticated word-processing equipment to ease the paper mill workload and to make the Area Offices more efficient; a simple method for reporting to headquarters; and a system for obtaining management information rapidly.

System Concept

Tribes, Headquarters, and Area Offices will have access to information stored in the system. This information will be stored in two mediums: word-processing systems and the IHS computer system. Word-processing systems will be primarily used at the Tribal Organizations and Area Offices to generate contracting and grants documents and to

Appendix D-4. Indian Health Services (Continued)

report to the system. The IHS computer system will provide the reportng capability available to all three functional areas.

Information can be input to the system in any form, manual or automated. Information will be generated as an output from the system in the same fashion.

Should any organization require that its information be private and not available to the general organization, then security procedures will be implemented for access to such information.

The TRAIS office will control all information flow into and out of the system. The office will also develop all updating and reporting data procedures. It will also be responsible for validating and verifying the data contents of the system and performing quality assurance on the data.

Overall System

The overall system for TRAIS will employ word-processing systems at each IHS Area Office and at Tribal Organizations which chose to have them. If word-processing systems are not used by the Tribal Organizations, they can use manual methods of interfacing with the system. The word-processing systems will be linked to the IHS computer via telecommunication channels (normally dialup telephone circuits). Procedures will be implemented in each Area Office and Tribal Organization for generating inputs to the system. It should be emphasized that reporting to the system will be a by-product of usage of the word processors.

Voluminous documents, such as contracts, will be generated on the word processors in a standardized, efficient and speedy manner.

Appendix D-4. Indian Health Services (Continued)

Abstracts will be developed on special reporting forms (or existing forms) for telecommunicating to the computerized data base. System updates will be generated daily so that all information will be current.

The word-processing systems will also have the capability to query the computerized data base and retrieve any information they so desire. Headquarters will also have a word-processing system for use in the same manner. If the need arises, then an Area Office can transmit an entire document to Headquarters (such as a contract) in a matter of seconds, or Headquarters can transmit to the Area Offices or Tribal Organizations.

Generally, the TRAIS will provide instantaneous document or information access to anyone on the system.

IHS Computer

The IHS computer is located in Albuquerque, New Mexico. The computer is an IBM System 370, Model 145 with a telecommunications module, on-line and batch data processing cabilities, with various peripheral equipment including magnetic tape drives, magnetic disk units, line printer, and card reader and punch. Various software packages permit sophisticated programming.

The telecommunications module allows for dialup or private line telephone data circuits, which provide for immediate access to the computer's data bases for users of the TRAIS. For example, the Area Office in Portland, Oregon, can dialup the computer on its word processor and either input data or retrieve data from the computer.

Appendix D-4. Indian Health Services (Continued)

The TRAIS data bases will be resident on the computer's magnetic disk units for immediate access. Backup data base files will be maintained on magnetic tapes. Reports can be generated on the computer's printer if so desired.

Telecommunications

The telecommunication channels for TRAIS will generally be between the Tribal Organizations and the computer, the IHS Area Offices and the computer, and IHS Headquarters and the computer. The computer will provide the logic for processing data requests or data base updates.

The word-processing systems will have telecommunicating capability either over dialup telephone circuits or private line circuits. Dialup circuits will be the most economical because of the short connect time required to access the computer.

The telecommunication channels planned for TRAIS will operate at either 30 characters per second, 200 characters per second, or 480 characters per second. At 480 characters per second, a fully typed 8-1/2 x 11 page can be transmitted from Anchorage, Alaska to Albuquerque, New Mexico in seven seconds. This capability provides for instantaneous information exchange between TRAIS components.

The primary use of the telecommunications option is to allow Tribes and IHS Area Offices to report data daily (or hourly as required) to the IHS computer and for IHS Headquarters to query the computer data base for immediate information.

Appendix D-4. Indian Health Services (Continued)

Tribal Management Support Center(TMSC)

TMSC serves as a national focal point for the development and advancement of tribal capabilities to man and to manage health programs. TMSC provides comprehensive assistance through technical consultation, systems development, training and education in the areas of management, and administration of health programs and institutions.

TMSC Training Services provides training for Tribal and IHS personnel in the areas of health systems management and administration. The goal of TMSC training is to further the capabilities of Tribes and Tribal organizations to administer health programs and to continually upgrade, through training, the administrative competencies of IHS personnel.

TMSC Training Services has developed a comprehensive continuing education program featuring a flexible curriculum design, training with direct application to daily job performance requirements, Continuing Education Units (CEU's), and interfacing potential with health administration and other degree programs at selected colleges and universities throughout the United States.

Definitions

1. Modules. A complete course of classroom study which is conducted in consecutive eight hour days. Module duration varies from 15 to 35 instructional hours.

2. Continuing Education Unit (CEU). A nationally recognized measure of the value of non-collegiate based training or education. One CEU is equal to 10 hours of instruction.

3. Certified TMSC Training Program. A pre-established course of study which, when completed, carried TMSC Training Certification. Certificates verify program completion and could be

Appendix D-4. Indian Health Services (Continued)

used as criteria for career upgrade, job selection, or upward mobility programs.

4. Adjunct Training Staff. Specialist in various fields of health management and administration who are regularly asked to assist in the development and instruction of certain modules.

5. Topical Consultants. Individuals whose expertise in specific areas of health management and administraiton is of sufficient value to be shared with training participants.

Program Features

Three features of the TMSC Training Program are training flexibility, training applicability, and continuing education credit.

Training Flexibility. Individuals eligible for TMSC training may choose from a variety of training options depending on personal needs and career requirements.

1. Single Module Design. Individuals or groups who desire training in a specific skill area may wish to enroll in only one training module.

2. TMSC Certified Program Design. Individuals or groups who desire thorough training in a particular area of expertise may enroll in a TMSC certified training program. A certificate indicating program completion and credit earned will be awarded to each successful participant.

3. Specialized Module Design. Constituent groups with unique training requirements which are not directly addressed by existing TMSC training modules may wish to have special training modules designed and conducted to meet those needs. TMSC will assist the group in the design and presentation of such training.

4. Training Site Flexibility. Although training modules will be conducted at the TMSC in Tucson, groups who find it more advantageous to receive training at an alternate location, may requiest on site training through the TMSC Training Services Chief. Sucgh requests will be honored given the availability of time and training personnel, and the satisfaction of minimum enrollment and training site requirements (see

Appendix D-4. Indian Health Services (Continued)

section on On-Site Training Requirements and Application Procedures).

Training Applicability. Each TMSC training module has direct application to the requirements of the job category for which the module is designed. As trining is received, individuals can immediately apply newly acquired expertise to the daily work routine.

Continuing Education Credit. Each TMSC training module carries a predetermined number of Continuing Education Units (CET's). The number of CEU's awarded is based on the number of hours spent in training. Individuals may accumulate CEU's as part of a preestablishex career advancement plan or for potential future college credit toward a degree program.

Value of TMSC Training Programs

To accomplish the goals of TMSC training, it is necessary that a wide variety of educational options be provided TMSC constituents.

1. The program which is currently available offers individuals the opportunity to enhance job performance skills.

2. TMSC training provides supervisors with a valuable resource for use in upward mobility planning, for their employees.

3. The TMSC Training staff is currently working on a program by which selected TMSC modules will be evaluated by the American Council on Education for recommendation of college level credit value. Modules which receive ACE credit recommendations will be listed in the ACE National Guide, a useful guide for colleges and universities who wish to translate non-collegiate training into college scademic credit.

4. TMSC is working to develop relationships with colleges and universities through the United States which will facilitate the acceptance of TMSC CEU's for college credit. It is conceivable in the future that cooperating colleges and universities throughout the United States will award college credit toward degree programs for TMSC training.

Appendix D-4. Indian Health Services (Continued)

TMSC Training Modules

The numbering scheme used by TMSC Training Services is designed to give an indication as to the depth of coverage of the material in the module.

100 level: Essentials training, designed to provide a solid foundation of knowledge to build upon through further training.

200 level: Intermediate training, often building directly upon training offered in corresponding 100 level modules.

300 level: Advanced training representing the culmination of training the subject area.

400 level: These modules cover a complete subject in one training sequence. They typically include an introduction to the important elements of the subject and often a practical exercise which facilitates use of knowledge gained.

MAN 100	Essentials of Management
WP 100	Essentials of Word Processing
CHS 100	Contract Health Services Training Development
HMO 100	Health Maintenance Organizations
MAN 200	Principles of Management
WP 200	Intermediate Word Processing
MAN 300	Leadership in Management
WP 300	Advanced Word Processing
HR 400	Community and Intro-Hospital Relations
CPA 400	Contract and Procurement Administration
HB 400	Health Services Budgeting Simulation
HCA 400	Health Care Administration
HFD 400	Health Facilities Development
HHM 400	Hospital Housekeeping Management
HP 400	Health Planning
HSP 400FA	Health Services Personnel Administration (Federal)
HSP 400FB	Health Services Personnel Administration (Federal)
HSP 400FC	Health Services Personnel Administration (Federal)
HSP 400T	Health Services Personnel Administration (Tribal)
LAW 400	Hospital and Health Law
OMA 400	Office Management and Administration

Appendix D-4. Indian Health Services (Continued)

POS 400	Project Officer/Director Seminar
PSA 400	Professional Standards and Assessment in the Health Fields
TT 400	Training the Trainer

Appendix E. A Challenge to GPHHA Students at UAB

by

Tee H. Hiett, Ph.D.

As you enter the GPHHA in September, you are very excited at having been selected for the program, and you have high expectations that the educational process here will be different from what you have experienced in the past, and you have a great desire to demonstrate immediately to me and to yourselves that you can meet my expectations. In my courses with subjects devoted to statistics, computers, and quantitative methods, you will find an approach to education different from that most of you have experienced. The development of the materials and the management system in these courses is evolutionary and being changed each year; so each year the students learn more about these subjects than did the students in the preceding class. With this article, I wish to describe for you my views of the traditional lecture method of education, to describe changes in the process and what these changes might mean to you, and to challenge you to participate in the revised process so you can learn even more than last year's class learned.

I realize that this article is rather lengthy, but I wanted to organize my thoughts and present them to you in writing so that you might review them at your leisure. The material in this article will be supplemented with a lecture either during orientation or during the first week of the quarter.

Most graduate programs in hospital and health administration have always included courses with some subjects devoted to statistics, computers, and quantitative methods. In the past in many programs, these

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

subjects were taught rather superficially, many by professors in departments other than health administration. One of the kindest things to be said for many of these courses is that they were merely hurdles students must pass in order to get the degree which would permit them to practice "real" administration.

It is instructive to examine some of the possible reasons why these courses were considered to be "hurdles." The reasons identified here are not necessarily mutually exclusive or exhaustive. One reason may be precipitated by or be related to other reasons, and there may be many other reasons that are not included in this discussion. I also want to point out that this discussion is not intended to lay blame for the educational process on the student or the teacher; rather, the intent is to describe the educational process as I see it, to indicate some changes which are being introduced, and to indicate what these changes are intended to accomplish.

The Traditional Process

Perhaps I can best begin with a common point of reference. Most of you have had at least one course in statistics, and most of you made an acceptable grade in that course; but few of you really understand statistics or how statistics can be a valuable tool of a hospital administrator. The mere mention of statistics is enough to make you cringe mentally, and the thought of having to take two more courses in statistics is enough to make you think about dropping out of the program.

Let me give you some of my thoughts as to why most students have a negative attitude toward a course in statistics and, indeed, the sub-

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

ject of statistics. Most of the points in this discussion can be applied to many other courses which include subjects devoted to statistics, computers, and quantitative methods. My views can be organized into four major groupings; the management system, relevant examples and practice, practitioner reactions, and the language requirements.

The Management System

I will begin with the traditional educational process in which you attended a course which met for three one-hour lectures each week for exactly 10 weeks. Periodically during the quarter (or semester), the teacher had scheduled examinations and quizzes. Your primary objective in these courses was to obtain an "acceptable" grade on each of the quizzes and on the course. In order to obtain an acceptable grade, you had to provide the teacher with the answers he wanted; therefore, you wanted to learn first which items the teacher would include on the examination. You probably devised several ways of identifying these items. For one thing, you would attend classes and observe the teacher, noting carefully any quirks or mannerisms which would emphasize the importance of an item or a point. You probably found it worthwhile to talk to students who had completed this course under this teacher to learn about the mannerism of the teacher and also to identify topics most likely to be on the examination. You also spent time getting and studying previous examinations of this teacher. After spending considerable time identifying like examination items, you spent the day or so before the examination studying those items. You carefully packed

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

your brain with many tidbits of information which you hoped would be unlocked with the key of a question.

During the examination, you rapidly wrote as much as you could about each of the items in hopes that your knowledge, however meager, would appear acceptable to the teacher when he graded "your paper." It is interesting to note that in this traditional lecture process, teachers did not "grade" you, they graded your paper. You did not have to look the teacher in the eye and expose your lack of knowledge. You could sit in the "middle of the class" and never ask (and maybe not ever have to answer) a question during the quarter. At the examination you would incorporate all the teacher's points you could recall into a hurriedly-written, voluminous paper. After you had drained your brain, you would slip your paper into the pile of other papers and rush to the exit in hopes of getting out of the room before the teacher picked up your paper, examined it, and asked you a question. You did not care to defend or elaborate upon any of your responses. You hoped for an acceptable grade.

In this environment, the teacher realized that you spent more time trying to identify likely examination items than you did actually studying the items once they were identified. In order to cause you to study more items, and thereby learn more about a subject near and dear to his heart, the teacher searched for ways of enlarging your list of possible items. He included more detailed points on his examinations (more depth). He changed the emphasis of his lectures. He added additional topics to his examinations (more breadth). As more teachers took

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

such actions, the greater became your potential workload. As the workload increased, you spent even more time trying to "beat the system" and reduce the workload. As you found ways to beat the system, teachers changed it. Continued responses from both students and professors produced a vicious cycle consuming much energy and time and, even worse, inhibiting learning.

One factor which limited this vicious cycle was time, and, as you may or may not realize, time is your ally for time is the ally of the student. No matter how boring a lecture is it only lasts for one hour, and every student has learned well how to endure for an hour. Although your body language may have indicated total concentration on the subject as though you were hanging onto the teacher's every word, your mind could be savoring a recent social event or anticipating a future social event. And no matter the amount of work the professor tried to foster on the students, the course lasted for only ten weeks for all students. Whether you learned much or not, the course would end and you would be through with statistics forever. The trick was to use the weeks much as you use the one-hour lectures--"let time go by."

You not only let time go by but you attempted to reduce the amount of material included as time went by. If the teacher was "reasonable," he would not hold you responsible for material he did not discuss in class. (After all, how would he expect you to learn the material if he had not "explained" it to you?) So you would maneuver the subject of the session to some irrelevant topic in which the teacher had considerable interest (even though you may have already heard the

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

professor's views on the topic). In a course in statistics, you might try to get the teacher to talk about his vacation in Spain, his political views, his sabbatical project, or any other topic off the subject.

Examples

Another negative aspect of your course in statistics was the lack of relevant examples with which you care to practice. The typical examples are so clearly contrived that they stifle your interest rather than to stimulate you to practice. You have seen many such examples. There are fourteen people seated around a circular table, half the people are women and half are men, the people are randomly assigned to seats, what is the probability that three men are sitting side by side? Faced with such an example problem, your first thought (and perhaps last real thought on the subject) might be what possible difference does it make. I doubt if you would have a burning desire to search for the answer to that type of question.

Practitioner Reactions

Another factor of the traditional process I want you to consider is the reaction of students who have completed specific courses and particularly those who have gone on to become successful practitioners. If you considered your parents to be successful in life, and if they were unable to help you with a specific algebra problem, you may have believed that the assignment was not worthwhile, and your learning may have been inhibited. If students who have completed a course told you to "hang in there" and "learn these few things" and then forget about subject, you may not have been very interested in "learning;" you may

have "hung in there" and tried to get an acceptable grade and out. Many hospital administrators who have completed courses in statistics, computers, and quantitative methods provide this negative feedback to students. Such feedback can inhibit your wanting to "learn" all you can about a subject. Unfortunately, such feedback seems to be the rule in courses devoted to statistics, computers, and quantitative methods.

Language Requirements

The final factor I want to review is that of the "language" in courses with subjects in statistics, computers, and quantative methods. Each of these subjects has a language which has developed over time by the specialists in the technology. Many of the phrases or words in these language have specific and sometimes subtle meaning. For example, the word "average" can be used to mean a number that typified a set of numbers of which it is a function. Yet an "average" can be more precisely identified as the arithmetic mean, the median, or the mode depending upon how the number was computed. Correspondingly, the term "standard deviation" has specific meaning in statistics. Learning the languages of a technology may seem an overwhelming task, particularly if the courses are not enthusiastically taught, with clearly relevant examples, and the practitioners do not reinforce the use of the language.

From these views of the traditional educational process, I turn to changes I am introducing and the intent of the changes.

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

Revised Process

The discussion of the revised process is organized around the same points used in the discussion of the traditional process: the management system, examples, practitioner reactions, and language requirements.

The Management System

In the revised educational process in courses including statistics, computers, and quantitative methods, you attend only a few lectures; most of your learning will be directed through student-paced teaching modules. At the beginning of the course, you will be given a list of the modules required for the course and copies of handouts for all required modules. Each handout contains a list of prerequisite modules, a rationale for the module, a list of specific objectives, and a list of suggested exercises and study sessions. In lieu of lectures, I will be available in the classroom each Monday, Wednesday, and Friday at 1:00 p.m. to help any student or group of students with problems. After all problems have been resolved and all questions have been answered, I will be available to check-in modules.

As soon as you know the material in the module or a set of modules, you can check-in the modules with me. At a check session, it is your obligation to convince me that you know the material; it is not my responsibility to ask you questions even though I may ask you questions. If you convince me that you know the material, I will accept the critique sheet from each of the submitted modules, and you will get "credit" for them. If you are unable to convince me that you know the

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

material, I will send you back for additional study and exercises and you will not get credit for any of those modules at that check session.

The number of modules, projects and other exercises required for the grade of C, B, and A is identified at the beginning of a course. Whenever you decide you have reached an acceptable grade in the course, let me know and I will send your grade to the registrar's office. If you do not complete the requirements for the desired grade by the end of the quarter, you will receive the grade of N, with no penalty. Whenever you do complete the requirements for the desired grade, the registrar's office will be notified.

One of the first things you should note about the revised process is that you do not have to guess at what I want you to learn, you do not have to get copies of previous examinations, you do not have to attend my lectures and study my delivery, you do not have to talk to students of last year's class to determine what I want you to learn. In the objectives, I tell what I want you to learn. The exercises and studies in the Suggested Study Guide section of the handout may be used as guides to facilitate your obtaining the proficiency indicated in the objectives. You should work through enough of these exercises and study sessions so that you can perform at the level of proficiency indicated in the objectives.

You will also note that you are required to attend only a few lectures. Instead of attending lectures, you can (although you are not required to) attend help sessions in which I will be available to help you with your specific problems. Typically, the help session lasts for

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

one hour. You are not required to be at a session at the beginning to participate; you may come to the session whenever you want to, and after you have received the help you need, you may leave.

After all questions have been answered and all problems have been resolved, I will begin checking modules for those students who are ready to submit them. You do not have to remain in the classroom during help session to be included in the check session. Before I terminate the check session, I will visit the room with computer terminals, the library, and other classrooms on the first floor to locate any student who has modules to check. So you are not required to listen to other students as they check-in their modules.

In this process, you cannot "sit in the middle of the class" and avoid discussing the subject with me. Even though you may not attend the help sessions, you must attend a check session to get credit for a module. At the check session, I will use whatever information I have to evaluate your proficiency in the material. At the end of the check session, which may last from one minute up to ten minutes, you will know whether you get credit for the modules or not. If you do not get credit, I will make suggestions for additional exercises and study session. As soon as you learn the material, you can re-submit the modules for credit with no penalty.

For most students, the check session seems to be the most threatening exchange, since I am no longer "grading your paper" but I am grading you. You must tell me something, and you must be prepared to defend, to elaborate upon, and to illustrate what you tell me. Few of

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

you have faced this type of evaluation before and many of you are concerned about such evaluation. Let me assure you that I want you to know the material as specified in the objectives for the modules. In most instances, you will know whether or not you really understand the material, and I suggest that you not present for a check session until you do understand the material. Students report that it is very frustrating to be sent back from a check session for additional work. They also report that there is little need to be sent back since they should have known the material before coming to the check session.

Another aspect of the revised process you will find frustrating is that time is no longer your ally. No matter if you lead me to discuss irrelevant topics, not matter if you merely sit there and let time go by, and no matter how much work you have to do in other courses, you simply must be able to demonstrate proficiency to get credit for a module or a set of modules. If at the end of the quarter you have not completed a sufficient number of modules for a grade acceptable to you, you will be awarded the grade of N which will revert to an F if it is not removed by the end of the next quarter. Therefore if you need it, you have two quarters in which to complete the work of one quarter.

You will also note that the modules are self-paced. If you have an excellent foundation in the subject, you can progress through them very rapidly. If your foundation in the subject is weak, you may require more time than many of the other students. In either event, you can work through the material at your own pace. There is no extra credit given for rapidly working through the modules. Do not be concerned

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

that there are students who are completing the modules faster than you are. Do not take comfort in the fact that there are several students who are not completing the modules as fast as you are. Learn the material as rapidly as you can consistent with your own capability.

Examples

Although most of the handouts for the modules contain references to other printed materials such as programmed learning texts, articles in journals, and audio-visual presentations, I have tried to use references with specific examples revelant to health services administration. If the references do not contain practical examples, I have incorporated some examples in the Suggested Study Guide. As I mentioned earlier in this article, the material in these modules are being revised each year; so I would appreciate very much your comments about the revelance of the examples in each module. I will modify the examples to make them more interesting and relevant.

Practitioner Reactions

Although the preponderence of practitioners have negative attitudes toward courses including statistics, computers, and quantitative methods, through the use of student-paced teaching modules, I am beginning to change the attitude of some of them. The use of modules is evolutionary, and the changes made each year cause more students in each class to learn more about these subjects than did the students in the preceding class. Many of these students become practitioners with positive viewpoints toward these subjects. In general, last years class will have a more positive attitude than will the class of year before.

Appendix E. A Challenge to GPHHA Students at UAB (Continued)

By clearly demonstrating relevance and by causing you to learn, I expect you to be able to do more with the technology from these subjects than did the students in the preceding classes, and I expect that you will exhibit a more positive attitude to the next class than the preceeding class did to you.

Language Requirements

Although I have tried to reduce the technical terminology in the modules, you simply must increase you vocabulary to include many new technical terms. Somewhat as you must learn the medical terminology of pathology, you must learn many terms associated with statistics, computer, and quantatitive methods. I have tried to set the technical terms in practical examples, to provide sufficient practice, and to cause practitioners to reinforce the use of the terminology. You will find your classmates using these terms, and you will begin to use them.

The Challenge

One of my major goals is for my students to be Number One in the nation in subjects in statistics, computers, and quantitative methods. To achieve this goal, I tell you what I want you to learn. I provide study guides to help you learn. I hold sessions to help you learn. And I require that you demonstrate proficiency.

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials.

by

Tee H. Hiett, Ph.D.

A Paper presented at the Fifth National Conference on Personalized Instruction in Education Washington, D. C., May 12-14, 1979.

The need to process words in Personalized Systems of Instruction (PSI) is explicit in the description of PSI developed by the Center for Personalized Instruction.

> In order for students to work at their own pace, the unit materials must be presented in a permanent form. The lecture on critical content is replaced by written materials. The third characteristic of PSI is an important emphasis on the written word for effective communication between student and teacher. Each teacher-crafted unit provides the student with planned objectives or study questions, refers the student to textbooks, readings, or special supplements (other sources of content may be derived from the laboratory, media, or the community), and suggests learning strategies.

The importance of the teacher-crafted units and the difficulty of producing such units may severely limit the adoption and use of PSI. The time and effort to develop such materials is comparable to the time and effort required to write a textbook. The authors of PSI materials can readily relate to the following textbook dedication by Thomas J. Schriber:

> To Ann,
> in recognition of the many hours stolen from our family life for this writing task, and with thanks for her patience, understanding, and good cheer (4)

The development of PSI materials also seems a lonely and never-ending task.

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

But help is on the way through the technology of modern word processing which is adapted from the technology of computers as used in data processing. Such technology can be used directly in the development and maintenance of each teacher-crafted unit. The technology also provides a basis for the sharing and exchange of such units among teachers while retaining for each teacher the efficient capability of editing each unit to meet his objectives.

Uses of Computer Technology in Education

Although the use of computers in education has not spread as rapidly as was predicted in the late 1960's, educators in the late 1970's are making increased use of computer technology. In an inventory of computers in higher education, Hamblen and Baird estimated that 41 percent of the institutions reporting provide interactive computing (2).

In education and excluding administrative uses, such as payroll, accounts payable, etc., computer technology currently has two major uses: data processing and computer assisted instruction (CAI) which is being expanded into computer managed instruction (CMI). With data processing, students learn to enter data into the computer, to edit the data, to use statistical procedures to analyze the data, and then to organize the results into tables and figures for use in reports. With modern high-level computer languages, such as Easytrieve, Statistical Analysis System (SAS), and Statistical Package for the Social Science (SPSS), students are finding it relatively easy to use the computer to

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

organize and analyze data and to report their findings. Such applications can free the student from the drugery of hours of tedious calculations, permitting them to use large sets of realistic data and to focus on wringing real information from the data.

The basic computer technology of data processing is also used in CAI. Although a standard description has not evolved, CAI tends to deal with drill and practice, tutorial, and dialogue instructional units. Typically a student sits before a computer terminal and is guided through a set of instructions by the computer. As in data processing, a number of languages, such as TUTOR, PLANIT, PILOT, and Coursewriter, have been developed to ease the task of writing CAI programs. In many of the CAI programs, the student is sequenced forward or backward through the material by the computer depending upon the responses; so that if a student is proficient in a subject, he may complete a unit with only a few responses. In most of the programs, the student is permitted to repeat sessions as many times as necessary to achieve proficiency.

As reported in articles in the Journal of Personalized Instruction by Pennypacker (3) and Bowles (1), the technology of CAI is being extended to CMI. Not only can the computer provide drill and practice, but computer technology can also be used to administer and evaluate tests, to produce study programs and learning guides, to schedule and sequence students through learning units, to report student progress periodically to the professor and to the student, and to report to

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

the professor on the responses to each test question and to each learning unit. Many of the programming languages of CAI can be used with CMI.

It is a well accepted fact that computers can process data and make comparisons faster and more accurately than humans can. Computers can move sets of data very rapidly, perform computations on the data very rapidly, and rapidly produce reports. What is not well known is that basically the same computer technology which processes data can be used to process text. (Throughout this article the word text is used as reference to alphabetical characters, numbers, spaces, words, lines, paragraphs, pages, and entire documents.) Much as computers can move sets of data quickly; computers can move text quickly. Much as computers can quickly and accurately locate a number in a set of data; a computer can quickly access a word or letter in a document. Much as a computer can quickly organize data for a report; a computer can quickly organize text for a report.

The systems through which computer technology is applied to processing words can be referred to as word-processing systems. The programming for such systems is even simpler than the high-level programming languages for data processing, CAI, and CMI. Typically, the operator enters text onto a screen either by typing the text from a keyboard or by using a few key strokes to recall a document stored on the system disc. The operator can then use a few command keys to move a pointer (cursor) about the screen and delete, insert, and move text. The simplicity of the language can be implied in a discussion of the components and functions of word-processing systems.

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

Basic Word-Processing Systems

Although different word-processing systems have different capabilities, all modern systems have the same basic components and common functions. The hardware of a modern system includes:

1. A central processing unit (CPU) with a system disc on which documents are stored and with computer technology to manipulate the text entered and stored on the disc
2. One or more work stations, each with a cathode ray tube (CRT) screen for displaying words and commands and with a typewriter keyboard for entering words and commands through the screen to the system disc in the CPU
3. One or more high-speed printers for producing typed copies of the documents on the system disc in the CPU
4. A unit for filing an archival copy of a document from the system disc of the CPU to a "floppy" disc
5. An optical character recognition (OCR) reader for copying directly from typewriter prepared pages into the CPU without re-keying the text
6. One or more devices for transmitting through telephone lines to other word-processing systems or to computers

The common functions of modern word-processing systems include the ability :

1. To mantain and to manipulate several thousand pages or several hundred documents in the CPU at the same time
2. To permit several work stations and printers to be used simultaneously
3. To display a page of the text of a document on the screen at a work station
4. To delete from and to insert into the text displayed on the screen and to incorporate those changes in the master document
5. To "move" (scroll) backward and forward through a document on the system disc and to display the text on the screen

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

6. To move and to copy text from one location in a document to another location in the same document

7. To move and to copy text from one document on the system disc to another document on the system disc

8. To enter and store commonly and frequently used phrases and lines of text into a glossary so that they can be recalled into another document with only one or two keystrokes

9. To automatically line-wrap so that hard carriage returns are not needed at the end of each line

10. To adjust the tabs and margins throughout a document as they are changed in the control location

11. To insert headings and footings including page numbers on each page automatically as a document is printed

12. To search throughout the entire document for a series of specific letters or words and to replace each occurrence with other letters or words

13. To print draft copies of documents at more than 2,000 words per minute and quality copies at more than 500 words per minute

14. To transmit documents through a telephone line to another word-processing system or to a computer.

In modern word processing, the first draft of the document is recorded in machine-readable form on a magnetic disc in the CPU as it is typed or after it has been typed. If the document is entered through a work station, the operator uses the typewriter keyboard to type the text which is displayed on the screen and recorded on a disc in the CPU as it is typed. If the document has been typed on a typewriter with a special character font, the text on the pages can be entered onto the system disc as the pages are put through an OCR reader.

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

After the document has been entered and recorded on the system disc, a draft copy is printed, usually at some high rate of speed such as 2,000 words per minute. After a copy is printed, the operator moves the master document from the system disc to "off-line" storage, typically a small (8 inch by 8 inch) "floppy" disc which has a capacity of some 125 pages of text. The draft copy is sent to the author for editing.

After the author indicates the changes on the draft copy, it is returned to the operator who incorporates these changes into the document. The operator brings a copy of the original document from the archive diskette to the system disc, uses the capability of the system to search quickly through the document, and makes only those changes indicated by the author, without retyping any of the unchanged material. The revised version can be printed while the operator is editing or drafting another document.

Since word-processing technology is typically used by secretaries who have had little or no training in computer programming, the commands of word processing have been developed so that they are very simple, generally requiring only a few hours of training. In most systems, the operator begins a session by selecting a specific function, such as creating a new document, editing an old document, and filing an old document to a system disc, by selecting the desired function from a list (called a "menu") of functions displayed on the screen. As the function

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

is performed, the operator is guided by a series of questions and statements (called prompts) which are displayed on the screen.

Word Processing and PSI

The capability of word processing is useful both in developing learning modules and in maintaining those modules. (In this context, a module is the teacher-crafted unit of text referred to in the description of PSI developed by the Center for Personalized Instruction.) In addition, word processing provides a means for the exchange and edit of learning modules, a capability which properly developed could permit a teacher to acquire a sufficiently large number of modules so that an educational program could be truly personalized.

The material in this section is drawn from five years of experience with word-processing technology in the development, use, and maintenance of approximately 175 student-paced modules in quantitative methods (QM), financial management (FM), and health economics (HE) in a graduate program in hospital and health administration. This program admits approximately 28 students each year to a two-year program in which all students take virtually the same courses during the first year on campus and study in a residency off campus during the second year. These students come from a wide range of backgrounds in mathematics, statistics, computers, accounting, systems engineering, financial management, and economics. The shift to student-paced modules in QM, FM, and HE was made to accommodate these different backgrounds.

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

Extensive editing is essential to the successful development of a module. The number of revisions depends to some degree on the amount of original material in the module. For a module which references existing documentation, only three or four pages may be required with only three or four edits. Other modules having extensive original material in 30-50 pages require as many as a dozen edits each. With the technology of word processing, extensive editing is efficient so the author can edit many times to assure that the material is technically and grammatically correct, logically developed, and properly organized and that the terminology and the format among the modules are consistent.

In the development of a set of modules, a teacher identifies a considerable number of standard references, phrases, objectives, and formats. Modern word processing with the capability to copy text from one document to another permits the rapid transfer of standard text among modules. Common references and phrases used in several modules can be put in a glossary and inserted into a module with only one or two keystrokes. And, of course, with modern word processing, formats can be very easily standardized among modules.

Modules should be revised at least annually. As students get credit for each module, they can submit a critique sheet identifying any difficulties they had with the material and identifying any errors in the module. Professors and proctors can also record problems they observe as they help students with the modules. Each year after a class

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

completes them, the modules can be revised. Sections can be added, sections can be deleted, sections can be revised, and the material can be reorganized to improve the efficiency and the effectiveness of the learning process for the students in the class in the next year. Word processing facilitates such a maintenance process, and such a process increases the efficacy of the modules.

Modules should be kept current. As new technologies are developed, as new references become available, and as the teacher changes the objectives, the changes should be incorporated into the modules. Such changes are made very easily with modern word processing.

The ease with which text can be edited on a screen at a work station with modern word-processing technology has considerable implication for its use in education. Fortunate indeed is the professor who has enough secretarial assistance; most professors have to make do with whatever help they can find. Yet many of these professors can type at some rate. The ease with which anyone (even at a low typing rate) can "cut and paste" electronically on a screen is simply amazing to those just being exposed to modern word processing. It may well be that even if a professor does have adequate secretarial assistance, he may find it more efficient to edit his own material on a screen at a work station rather than to mark the changes on the draft copy, return the copy to an operator, and wait for the revised version.

Even though modern word processing provides considerable efficiency in editing, the major impact of word processing on PSI may be in

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

the sharing and exchange of modules. Even with word-processing technology, the most dedicated teacher can develop and maintain only a few hundred modules. Although this number of modules may be adequate for self-paced programs of instructions, a teacher needs access to a few thousand modules to develop truly personalized courses of instruction. The need for access to a large number of modules is especially critical to a program such as a program in hospital and health administration in which students present a wide variety of backgounds. In such programs, a teacher in QM needs access to modules in mathematics ranging from such basic concepts as a system of coordinates through some concepts involving integration and modules in statistics ranging from simple description through factor analysis. An equally wide range of modules are needed in topics in QM, FM, and HE.

If many teachers within a discipline could have access to modern word-processing systems, if these teacher would collaborate in identifying the topics for which modules should be developed, and if they would divide the topics among themselves with each teacher developing, testing, maintaining, and sharing his modules, each teacher would have access to the several thousand modules necessary to make his courses truly personalized. Consider a specific example. Suppose several teachers of QM, FM, and HE in graduate programs in hospital and health administration would collaborate in the development, test, maintenance, and exchange of modules. These modules could be stored in both machine-readable form and typed form in some central organization such as the

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

Center of Personalized Instruction or the Association of University Programs in Health Administration (AUPHA) for distribution. Each of these modules would be edited and updated annually by the author. All of the modules would be available for distribution to teachers in graduate programs in hospital and health administration in either typed copy or machine-readable copy. A teacher using any of the modules would be given considerable editorial latitude in modifying the modules so they reflect the objectives of that teacher (still giving recognition to the author of the modules). Such modifications could be made by the teacher through word processing at his university or for the teacher at the central organization.

Conclusion

Modern word-processing technology has considerable implication for the development of teacher-crafted learning units and for PSI. Such technology can be used directly in the development and maintenance of each teacher-crafted unit. The technology also provides a basis for the sharing and exchange of such units among teachers while retaining for each teacher the efficient capability of editing each unit to meet his objectives, a potential which will provide each teacher with sufficient modules to permit personalizing instruction. (Examples of two organizations effectively using modern word processing are presented in Appendix A to this article.)

Even though teachers may begin on their own to use word processing to develop and maintain their own modules, experience indicates that

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

teachers are not usually inclined to share their teaching materials. One reason materials are not shared may be that each teacher has to develop materials for all the topics in several courses and, therefore, simply does not have time to organize and to edit all of these materials sufficiently so that he is proud to share them with other teachers. Another reason may be that teachers do not get the "academic" credit for shared materials that they get for articles published in national journals. Some teachers may delay sharing their materials in hopes of finding time to organize and publish them. No matter the reasons, teachers do not typically share materials.

A national or regional program may be required to stimulate and coordinate the development, maintenance, and exchange of modules. Coordination, as the term is used here, means the identification of the topics susceptible to this methodology and the identification of a teacher or teachers with the expertise and interest in developing a set of modules for these topics. Stimulation, as the term is used here, means causing teachers with specific capabilities to develop an initial set of modules, to introduce the modules into the system, to revise and up-date these modules annually, and to participate in the use of these and other modules. Perhaps the major stimulus would be providing "academic" credit for the development and maintenance of a series of modules. (A detailed examination of possible activities of a national center for modules in health administration is presented in Chapter IV of the report to which this article is appended.)

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

A large number of teacher-crafted modules are at the heart of PSI. The technology of modern word processing permits a teacher to develop and maintain modules and to edit modules developed by other teachers. Application of the technology may permit us to extend Keller's comment to "Goodbye, Textbooks... and Hello, PSI Units..."

Appendix F. Modern Word-Processing Technology Provides a Practical and Efficient Means for Developing and Maintaining PSI Materials. (Continued)

References

(1) Bowles, K. L. "Microcomputer-Based Mass Education." Journal of Personalized Instruction 3:151-156, 1978

(2) Hamblen J. W., and Baird T. B. "FICHE Bytes: An Executive Summary." Bulletin of the Interuniversity Communications Council (EDUCOM) 13: p. 2, Winter, 1978

(3) Pennypacker, H. S. "The Use of Hardware in the Design of Personalized Instruction." Journal of Personalized Instruction 3:144-150, 1978

(4) Schriber, T. H. Simulation Using GPSS. New York: John Wiley & Sons, 1974, p. v.

Appendix G-1. Sample Schedule Sheet

Name: SS#: Class 15 1979-1980

Schedule of Requirements for HA532-HA533

Requirement Deadlines		C Requirements Completed	B Requirements Completed	A Requirements Completed
HA532 QUANTITATIVE METHODS IN HOSPITAL AND HEALTH ADMINISTRATION (3 hrs.)				
Sep. 18				
Sep. 24				
Oct. 5				
Oct. 12				
Oct. 19	QH1, QH2			
Oct. 26	QH3, QH4			
Nov. 2	QH5, QH6			
Nov. 9	QH7, QH8			
Nov. 16	QH9, QH10			
Nov. 21	QH12, QH13			
Nov. 30	QH14, QH15			
	END OF FALL QUARTER			
Dec. 7	QH16, QH17			
Dec. 14	QH18, QH26			
	BEGINNING OF WINTER QUARTER			
Jan. 11	QH27, QH28			
HA533 OPERATIONS RESEARCH IN HEALTH MANAGEMENT I (2 hrs.)				
Jan. 18	QH29, QH30			
Jan. 25	QH31, QH32			
Feb. 1	QH33, QH34			
Feb. 8	QH35, QH36			
Feb. 15	QH19, QH20			
Feb. 22	QH21, QH22			
Feb. 29	QH23, QH24			
Mar. 7	QH25, QH11			
	END OF WINTER QUARTER			
Mar. 15	QH37, QH38			
Mar. 21	QH39, QH40			

B Requirements HA532 8 Modules on TSO and SAS
HA533 8 Modules on Batch and SAS

A Requirements HA532 Project using statistics, SAS, and hospital data
HA533 Project using statistics, SAS, and hospital data

HA532 Grade submitted:_____ Grade Sheet #_____
HA533 Grade submitted:_____ Grade Sheet #_____

Appendix G-2. Sample Introduction Sheet

Introduction

The use of statistics is mandatory in modern health services management. For example, managers in hospitals should be able to understand and to use information about the nature of the costs and the resources used per patient stay by diagnosis (and by department?) in planning resources and in preparing for prospective payment for services. In addition to the internal uses of information generated by statistics, managers must produce (and should use) the analyses required by such governmental agencies as the Health Systems Agencies. Requests for such analyses as trends in demands for services are becoming routine.

The modules QM1-QM40 are a review of basic statistics including the use of the Chi-Square Distribution. Although most of these modules include example problems in the Suggested Study Guides, you should not routinely and blindly work through these exercises (an example of "Freshman Chemistry Lab Mentality"). To get the most from these modules, you should collect data in which you have interest, work enough of the exercises in the module to assure understanding, and apply the techniques to your data set. This approach can be especially valuable if you working for a B or A in the courses and learn to use the SAS (Statistical Analysis System) program, for then you will be able to manipulate large and meaningful sets of data with the computer.

You will check in the modules in six groups.

1. QM1-QM6, Basic Statistics
2. QM7-QM10, Counting and Probability
3. QM12-QM18, Binomial and Normal Distributions
4. QM26-QM36, Test of Hypotheses
5. QM19-QM25, Regression
6. QM37-QM40 (including QM11), Chi-Square Distribution

When you are sufficiently prepared to demonstrate your proficiency in all the modules in one of the six groups, meet at me a check session following a help session. You will either get full "credit" for all the modules in the group or I will require that you study more and do additional exercises. When you are successful at a check session, I will take the Critique and Evaluation sheet for the modules. Be sure your name and the date are on the sheet so you will receive credit for the modules. I also appreciate having your comments on these sheets.

I hope you learn to use statistics.

5790b/0033A/09/17/79 Tee H. Hiett, Ph.D.

Appendix G-3. Sample Critique and Evaluation Sheet

QM1-QM2 GPHHA/UAB

Name _____ Date _____

Critique and Evaluation

The purpose of the modular approach to education is to provide the students with a learning experience which is both efficient and effective. Since the handout for these modules serve as a guide to learning and as a disseminator of information, the quality of the handouts affects both efficiency and effectiveness. Therefore, it is important that the written material in these handouts be understandable, comprehensible, and easily read. If you have any difficulty or find any fault with the material in these handouts, please describe your views on this page (using the back of the page and other pages if necessary). Some examples of what we would like to know are:

1. Where was the development of the material confusing?
2. Are there other examples which should be added?
3. Where are the typographical errors or other errors in the handout?
4. How much time (to the nearest 1/4 hour) did you spend studying this module?

Comments:

Appendix G-4. Sample Modules

Introduction to Statistics

PREREQUISITES

None

REFERENCES

1. American Hospital Association. Hospital Statistics. 1975 ed. Chicago: AHA, 1976, 205 pp. (Several copies of issues for several years are available in GPHHA library)

2. Helwig, J. T. SAS: Introductory Guide. Raleigh, NC: SAS Institute Inc. 1979, 83 pp.

3. Parker, S., and Terrace, H. S., eds. Psychological Statistics. San Rafael, CA: Individual Learning Systems, 1975, Vols. 1-7.

4. Warner, D. M., and Holloway, D. C. Decision Making and Control for Health Administration. Michigan: Health Administration Press, 1978, 427 pp.

RATIONALE

Statistics, like many other subjects, has some basic terms which are defined and then are used in developing, defining, and explaining basic concepts. Managers of health services must be able to use these terms properly in order to understand the concepts and to make the concepts an integral part of their management tool kit.

The statistical terms population, sample, subject, raw data, statistic, parameter, and variable are presented in this module.

OBJECTIVES

1. Without the use of any references, and given a set of ten items and the statistical terms population, sample, subject, raw data, statistic, and parameter the student must be able to match the correct statistical term with at least eight of the items.

2. Without the use of any references, the student must be able to identify, orally or in writing, at least two health-related examples of the statistical terms population, sample, subject, raw data, statistic, and parameter.

3. The student must be able to define, orally or in writing, the word variable and name five variables of interest to health services managers.

Appendix G-4. Sample Modules (Continued)

4. The student must be prepared to demonstrate mastery by showing that he understands the problems and topics referred to in the Suggested Study Guide of this handout.

SUGGESTED STUDY GUIDE

1. In Reference 3 on pp. 1-1 - 1-4, study the definitions of the statistical terms, and on pp. 1-5 - 1-11 work through the Practice Exercises and Progress Checks. Bring these exercises and checks to the check-in session, and be prepared to discuss your work.

2. If you are working for a B in this course, complete this exercise; otherwise skip this exercise and go to Suggested Study Guide 3.

   In Reference 2 on pp. 2-4, study the definitions and the organization of data for entry into a computer.

3. Study the following material related to the statistical term variable.

   A variable, as the term is used in statistics, is a name of a characteristic or phenomenon which can assume any of a set of values. An example of a variable in health services management is the daily census of the number of patients in the hospital each day. A hospital may have enough beds to care for 450 patients; however, the number of patients in the hospital varies from day to day. For example, on Wednesday, July 17, the hospital had 397 patients; on Thursday, July 18, the hospital had 405 patients; on Friday, July 19, the hospital had 390 patients; and on Saturday, July 20, the hospital had 375 patients. Number of inpatients per day is a variable which can take on values from 0 through 450, the maximum number of patients the hospital can accommodate in one day.

   Other variables which may be of interest to health services managers include:

   a. Admissions per day
   b. Discharges per day
   c. Number of meals served per day
   d. Pounds of laundry processed per day
   e. Number of surgical procedures per day
   f. Number of births per day
   g. Number of employee hours per day by department
   h. Patient revenue per day
   i. Patient revenue per patient day
   j. Expense per day
   k. Expense per patient day
   l. Net revenue per patient day
   m. Days of revenue in patient accounts receivable
   n. Daily census

Appendix G-4. Sample Modules (Continued)

It should be obvious from this brief list that health services managers are concerned with describing, understanding, and predicting the values of many variables.

4. In Reference 4 examine the tables and figures listed below and in the space on this page beside the table and figure write the names of the variables in the table and figure and the range of values for each variable. Check your answers with those in the Answer Key at the end of this handout. If you do not get at least 80 per cent on the first attempt, work with other examples. Bring your work to a help session.

   a. Figure 5.2, p. 119

   b. Figure 5.5, p. 125

   c. Table 5.3, p. 129

   d. Table 5.4, p. 135

   e. Figure 6.2, p. 193

   f. Figure 6.10, p. 209

   g. Table 7.1, p. 243

5. In Reference 3 on p. 1-3 in the lower half of the page, note the reference to sample selection. This topic is the subject of a module which comes later in this sequence.

6. Study the following material regarding samples and populations, and write beside each of the items in the list a P if the item represents a population and an S if the item represents a sample of a population. Check your answers with those in the Answer Key at the end of this handout. If you do not get at least 80 per cent on the first attempt, work with other examples. Bring your work to a help session.

   In statistics, the term sample is not merely a subgroup or subset of a larger group. Generally, a sample is randomly selected (the subject of another module) from a population so inferences can be made about the population on the basis of the statistics computed from the subjects in the sample. A subgroup is merely any collection of the items in a set. For example, all the U. S. hospitals with more than 500 beds form a subgroup of all U. S. hospitals; but it would be foolish to make inferences about all U. S. hospitals on the basis of the statistics of this subgroup. Information about each of the U. S. hospitals with more than 500 beds would be considered a population, not a sample of all U. S. hospitals (even though the group would be a subset of all U. S. hospital) and the values computed from these data would be parameters. As another

Appendix G-4. Sample Modules (Continued)

example, consider all mental health hospitals in the U. S. Although these hospitals are a subgroup of all U. S. hospitals, one would not make inferences about all U. S. hospitals based on the statistics computed from this subgroup, so this group would be considered a population, not a sample.

a. All of the hospitals in Alabama_____
b. Fifty of the hospitals in Alabama_____
c. All Alabama hospitals with more than 100 beds_____
d. The continuous one-week study of the arrival time of patients at the emergency room of University Hospital_____
e. Records of 25 hospital patients_____
f. All health services managers with MHA degrees_____

7. Write in the space provided beside each item a P if the item is a parameter, an R if the item is raw data, or an S if the item is a statistic. Check your answers with those in the Answer Key at the end of this handout. If you do not get at least 80 per cent on the first attempt, work with other examples. Bring your work to a help session.

a. A hospital administrative (HA) resident records, at five-minute intervals, the number of people in line at the hospital cafeteria_____
b. An HA resident computes the average daily census for the month_____
c. The percentage of Alabama residents who have been exposed to tuberculosis_____
d. The number of requisitions filled by the purchasing department today_____
e. A patient completes a form for admissions to University Hospital_____
f. An HA resident determines the distribution of the number of eggs used each day for breakfast during the past month_____
g. The average size of all hospitals who are members in the American Hospital Association (AHA)_____
h. An HA resident counts the number of beds in University Hospital_____
i. An HA resident consults the Hospital Statistics issue of the AHA to determine the number of newborns in AHA member hospitals in 1972_____
j. An HA resident determines the average age of the employees of University Hospital_____

8. Write three examples from the health industry (other than those identified in this handout) of each of the following:

a. Population _____ _____ _____

b. Sample _____ _____ _____

Appendix G-4. Sample Modules (Continued)

PREREQUISITE

The Module on Introduction to Statistics, QM1

REFERENCES

1. Parker, S., and Terrace, H. S., eds. Psychological Statistics. San Rafael, CA: Individual Learning Systems, 1975, Vols. 1-7.

2. Warner, D. M., and Holloway, D. C. Decision Making and Control for Health Administration. Michigan: Health Administration Press, 1978, 427 pp.

RATIONALE

As more of the practices, procedures, and principles of management science are introduced into the management of health services, more measurements will be introduced. There are four basic types of measurement, each with its own scale. Since the statistical procedures which can be used with a set of data resulting from measurement are limited by the scale used in the measurement, managers of health services should be able to identify the scales used in measurements and to identify which statistical procedures can be used with which sets of scales.

Nominal, ordinal, interval, and ratio scales are presented in this module.

OBJECTIVES

1. Without any additional references and given sufficient information about ten measurements from health services management, the student must be able to identify correctly, orally or in writing, the scales used in at least eight of the measurements.

2. Without the aid of any references, the student must be able to write or state at least three health services examples for each of the four scales.

3. The student must be prepared to demonstrate mastery by showing that he understands the problems and topics referred to in the Suggested Study Guide of this handout.

Appendix G-4. Sample Modules (Continued)

SUGGESTED STUDY GUIDE

1. In Reference 1 on pp. 1-12 - 1-17, study the definition of measurement, the description of information obtained from measurement, and the definitions and additional information on nominal scales, interval scales, and ratio scales.

2. In Reference 1 on pp. 1-18 - 1-25, work through the Practice Exercises and Progress Checks. Bring these exercises and checks to the check-in session, and be prepared to discuss your work.

3. In Reference 2 on pp. 308-312, study the discussion of measurement scales.

4. In each of the following examples, write the name for the scale used in measurement as either nominal, ordinal, interval, or ratio. Check your answers with those in the Answer Key at the end of this handout. If you do not get at least 80 per cent on the first attempt, work with other examples. Bring your work to a help session.

   a. Patient room numbers on one floor _____
   b. Severity of patient illness _____
   c. Patient's temperature on Fahrenheit scale _____
   d. Daily census _____
   e. Emergency treatment room visits _____
   f. Degree of patient incontinence _____
   g. Time to perform a surgical procedure _____
   h. Treatment or procedure name _____
   i. Raw scores on employee attitude survey _____
   j. Temperature in the hospital laundry _____
   k. Number of surgical procedures for a day _____
   l. Patient identification numbers _____
   m. Relative humidity in the hospital operating room _____
   n. Patient's age _____
   o. Employee titles _____
   p. Sizes of employee uniforms _____
   q. Number of beds in a hospital _____
   r. Number of employees _____
   s. Size of rubber gloves _____

5. In the space provided below, write five examples of measurements in health services management for nominal, ordinal, and ratio scales. Do not use any of the examples listed in this handout.

Appendix G-4. Sample Modules (Continued)

6. Study the description of a set of data with 17 variables on 899 patients using the records for patients numbered 19 and 20. In the space provided, write the scale used for each variable. Check your answers with those in the Answer Key at the end of this handout. If you do not get at least 80 per cent on the first attempt, work with other examples. Bring your work to a help session.

```
19 Reco 0 12 132 2 1 1 1 12 4 1862 12 31 74 2  6
20 Reco 0  9  98 2 2 2 2  8 2  970 10 15 75 3 32
```

These variables can be conceptualized as being listed across a page in 18 columns and the cases being listed in sequence down the page with each row containing the value for each of the 15 variables for that case (patient). In each case, the first variable in columns 1-2 is SEQNUM, the number assigned to each case in sequenace. That number then becomes a part of the file and can be used to access specific cases in the file.

The second variable in columns 4 and 5 is PRIMSERV, the code of the primary service provided the patient. This variable can take on values 1-20, with each of these numbers representing a primary service. If PRIMSERV has the value 2, this was a surgery patient. If PRIMSERV has the value 17, this was a cancer patient.

The next variable is ADMPHY, the admitting physician number in columns 7-9. This variable can take on the values 1-154 corresponding to the number assigned to the physician by the hospital.

The fourth variable in column 11 is FINCLASS for the financial class of the patient with values 1-8. For example, the number one indicates Medicare payment, and the number four indicates Blue Cross payment.

The fifth variable in column 13 is AGECAT for catagory of the age of the patient with 1 representing 0-19 years, 2 20-34 years, 3 35-49 years, 4 50-64 years, and 5 65 years and above.

The sixth variable in column 15 is RACE with 1 representing white, 2 representing black, and 3 representing other.

The seventh variable in colum 17 is SEX with 1 representing male and 2 representing female.

The eithth variable in columns 19-20 is STAYDAYS for number of days the patient was in the hospital with values of 00-99 days.

The ninth variable in column 22 is HOMELOC for location of patient's home with 1 representing the county in which the hospital is located, 2 representing other counties in Alabama, 3 represeting the neighboring state, and 4 representing other states.

Appendix G-4. Sample Modules (Continued)

The tenth variable in columns 24-27 is TOTCHARG for the total charges of the services to the patient in dollars, with a range of values including 00-99999.

The eleventh variable in column 29-30 is ADMONTH for month of admission with 1 representing January and 12 representing December.

The twelfth variable in column 32-33 is ADMNDAY, day of month admitted with values from 1-31.

The thirteenth variable in columns 35-36 is ADMYEAR, the last two digits of the year the patient was admitted.

The fourteenth variable in column 38 is ADMWDAY for day of week of day patient was admitted, with Monday represented by 1 and Sunday represented by 7.

The fifteenth variable in columns 40-41 is AGEYRS with the patient's age in years, with values from 00-99.

1._____	6._____	11._____	16._____
2. X	7._____	12._____	17._____
3. X	8._____	13._____	
4._____	9._____	14._____	
5._____	10._____	15._____	

STUDY GUIDE KEY

4.	a. Nominal	h. Nominal	o. Nominal
	b. Ordinal	i. Ordinal	p. Ordinal
	c. Interval	j. Interval	Q. Ratio
	d. Ratio	k. Ratio	r. Ratio
	e. Ratio	l. Nominal	s. Ordinal
	f. Ordinal	m. Interval	
	g. Ratio	n. Ratio	

6.	1. Nominal	6. Nominal	11. Nominal	16. Nominal
	2. X	7. Ordinal	12. Ratio	17. Ratio
	3. X	8. Nominal	13. Nominal	
	4. Nominal	9. Nominal	14. Nominal	
	5. Nominal	10. Ratio	15. Interval	